

The Sportsman's Handbook
to
PRACTICAL COLLECTING
and



RESERVING TROPHIES

by

Rowland Ward F.Z.S.

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Mr. Smuts.
With kind regards.
Dec: 2: '93

THE SPORTSMAN'S HANDBOOK.

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THE SPORTSMAN'S HANDBOOK
TO
PRACTICAL COLLECTING,
PRESERVING,
AND
ARTISTIC SETTING-UP
OF
TROPHIES AND SPECIMENS.

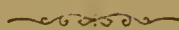
TO WHICH IS ADDED

A Synoptical Guide to the Hunting Grounds of the World.

By ROWLAND WARD, F.Z.S.

Sixth Edition.

WITH NUMEROUS ILLUSTRATIONS.



London :

THE AUTHOR, 166, PICCADILLY.

SIMPKIN, MARSHALL, HAMILTON, KENT, & CO., LIMITED.

STATIONERS' HALL COURT.

1891.



CHARLES DICKENS AND EVANS,
CRYSTAL PALACE PRESS.

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This Book is Dedicated to
THE REVERED MEMORY OF
THE LATE HENRY WARD,
OF LONDON,
(MY FATHER).

WHOSE EMINENCE AS A PRACTICAL TAXIDERMIST,
AND AS
TRAVELLER, SPORTSMAN, AND NATURALIST,

I PRIZE LIKE AN INHERITANCE,
AND AFFECTIONATELY EMULATE.

ROWLAND WARD.

ADVERTISEMENT.

THE several emendations of and additions to the text, as well as the further illustrations that have been introduced into this the SIXTH EDITION of the SPORTSMAN'S HANDBOOK, will, it is hoped, be found to make the work more complete, not only as an adjunct, but as a record, of world-wide sport among great game.

R. W.

August, 1891.

PREFACE TO THE FIFTH EDITION.

SINCE the Fourth Edition of this book was published in 1888—but two years—several considerable and very interesting questions have received advancement, or solution, in relation to the world of sport. The principal of these is the extension of the geographical area where great game may be sought and encountered in Africa. It is premature just now to announce definite conclusions, even as to the area that may come to be available to the sportsman; it is, however, safe to assume that it is great, and will be greater, in that division of the world to which I refer. But while this extension of ground for the sportsman is resulting and may result in Africa, in America the balance is redressed by civilisation creeping, with its ill effects and its good effects, on to the spaces where Nature has hitherto been untrammelled in her work. The Bison has been swept from the grounds required for human uses, and even now has disappeared almost entirely from vast regions which were characterised by his presence in countless thousands. Sport in Asia has been pursued with average success on Indian fields: but

the game are not reported as more numerous than in former years; perhaps they are more pressed by modern appliances. Yet one triumph has been made: the true *Ovis Poli*, as well as some others of the great sheep, has been shot by a British sportsman. Hitherto these shy and wary creatures have become specimens in our museums mostly by natural demise in their native haunts, or by demise possibly accelerated by native huntsmen.

In the matter of using poisonous or non-poisonous preservatives, some valuable experience has been gained, of especial interest to me, as I was one of the first to advocate the adopting of the innocuous compounds. I have no need, and no intention, to recede from my expressed conviction that the non-poisonous preservatives are quite efficacious for their purpose, and as valuable in their result as any of the poisonous compounds. I continue my use of them. There are conditions under which both means fail in the hands of disputants as to the value of either resource. No preservative is efficacious against incompetence in the application of it, or is preventive of the effects of simple neglect. Specimens of natural objects require occasional care for their continuing preservation. If an owner puts up, say, a series of horned heads, and leaves them without any attention for many years, he must not be surprised to find the ordinary agencies of decay work ruin on his

specimens. His housekeeper would not treat her blankets or curtains so, but would by timely attention keep them safely as long as they are to last. In like manner the mere brushing up, and re-dressing with turpentine, of natural history specimens will retard or prevent their decay.

I record with peculiar satisfaction the fact, of which I have had overwhelming evidence, that the publication of this book has brought about a most salutary change in the methods of saving specimens on the field, which has resulted in a conspicuous gain in the perfect preservation of natural historical examples.

That the preference of the best sportsmen for a lighter armament than used to be adopted with great game has been confirmed, almost in a ratio relative to the skill and experience of the particular hunter, is a fact to which I directed particular attention two years ago; to-day it is more conspicuous as a fact than it then was. Skill in the use of weapons is of better value in the result than a simple reliance on the force or size of projectiles.

It may be said justly that now more than ever the true sportsman among great game seeks to be a naturalist, and to subserve the interests of science, as well as to secure his own gratification.

R. W.

July, 1890.

PREFACE TO THE FIRST EDITION.

I HAVE made an endeavour, by the following pages, to present for the sportsman-naturalist some information that may be valuable to him as derived solely from *experience*—either the accumulated experience of my family, of whom I am now the only representative in our profession, or the carefully collected experience of others in those parts of the subject where my own work has not carried me. My grandfather was a practical naturalist; my father, the late Henry Ward, became eminent in the same way, but with some remarkable advantages, having travelled much in pursuit of his profession in both hemispheres, and notably as the companion of Audubon, when that distinguished man was so greatly enriching and extending the field of natural history. I have been greatly assisted by the information given me by many travellers and true sportsmen. It has been my object to avoid mere speculative opinion, and to make the book as concise as might be.

It is only in comparatively recent times that taxidermy has been elevated to claim any real art position. What has been gained for it has not been achieved by mere skill, but by extended and more accurate observation of nature in its living forms—of the behaviour and habits of animals, not simply examination of their carcasses, or what remained of those. Such observation, carefully and correctly recorded, is invaluable to the naturalist who seeks, by the preservation unimpaired of the natural features of an animal, to use the verisimilitude so obtained as an aid to art illustration. The material means for such a result are indeed important; but something more may be done with a prepared group of animals, or a single specimen, than preservation for the identification of details in anatomy or of outward appearance. Its value to the student may be preserved and increased by displaying its beauty truthfully to life, while the beauty is recognised for its own sake by even the unscientific. This is the cause I advocate, and the end I have in view.

R. W.

May 12th, 1880.

THE

SPORTSMAN'S HANDBOOK.

INTRODUCTORY.

IN starting from this or any other country on an expedition for collecting, that is likely or certain to separate him from the means and conveniences that he can command for money in settled and civilised communities, it is all important for the explorer or sportsman to provide himself carefully with everything he may want. But it is more important still that in doing so, he be able to define what his real wants are, and restrict the satisfaction of even these with skill to the smallest proportions. He should therefore quite judiciously consider what he really does need that it is desirable he should take with him, because he cannot obtain it so well elsewhere; but it is not well to imagine possible difficulties or wants, and endeavour to provide for them particularly. In regard to most

of the apparatus, simplicity is essential to real usefulness. Attention should be paid to appropriateness of dress, and experience has shown that on the field the entire dress should be of one colour, and that a dull tint. White should not be exhibited, even so much as a linen collar, or a pocket-handkerchief. White is the most distinctive colour in a jungle. But all appointments should be made always with the recollection that in this respect a small modicum of native experience in any country is worth any amount of speculation out of it. That observation may also apply to most of the shifts and expedients of camp life. The well recorded experiences of good sportsmen, who have gone in similar fields before, are of infinite value to instruct; not for the simplicity of servile imitation in particulars, since the conditions may entirely differ, but as exemplifying the principles on which given means were applied to certain ends. Important factors in the consideration of these questions are the strength, stature, and constitution of the sportsman himself.

The progress of invention has of late years strengthened the position of the sportsman in respect of his armament, especially as regards great and dangerous game. He has wide choice of excellent weapons. In recent times this abundant facility a little vexed the question, and some good sportsmen thought they recognised the obtrusion of not indeed a fresh element, but more prominence for it—the endeavour to cloak deficiency of skill by increase of more mechanical power in dealing with great game. In reality, the conditions have not changed for the true sportsman, who seeks rather an exercise of his skill and courage than the silly vanity of copious

butchery. Indifferent ability may find compensation of a kind in that, but hardly the admiration of the judicious. In selecting particular weapons, each man will follow his bent; but on some points there is a consensus of opinion among good men that should strongly influence: That in the hands of a true sportsman of fine skill the chosen weapon for dangerous game should be as light as may be in relation to his personal strength, so that his ability to wield it easily may be without doubt: The "Express" rifle, on account of its easy carriage and manipulation, its power for internal wounding, its accuracy and extended point-blank range, is lauded by many as all-sufficient for ordinary game: For large game and dangerous animals a heavier bore is by some considered requisite, but one of not excessive capacity is sufficient for credit in good hands: The weapons should be carefully suitable to the sportsman's muscular power, and to his length of reach, etc. Lately a decided reaction has set in in favour of a light armament, and no doubt the example of that most accomplished and experienced gentleman sportsman, Mr. F. C. Selous, whose exploits among great game on the African fields are perhaps unequalled, has greatly influenced the feeling. It is well-known that Mr. Selous has given up the use of 4 bores and big charges for elephant and rhinoceros, and has expressed a wish that he had never used them, never undergone the labour of wielding them, or encountering their inevitable recoil, the effects of which he can regretfully feel. In his most skilful hands a .450 "Express," with hardened conical bullet, is, he says, all-sufficient for great game. But his accuracy of aim and knowledge of the vital spots on which

to smite his game are all-important considerations for the result. Later on in this book will be given diagrams of vital shots, and it may be added that, in marking them, I was assisted by Mr. Selous' exceptional experience of result in action to check or confirm my own anatomical knowledge. Some sportsmen, indeed, while admitting fully the suitability and sufficiency of the .450 "Express" for all soft-skinned game, dispute its sufficiency for the great pachyderms, or even for buffalo. They miss the smashing power and the paralysing effect of the heavy bores. This view has been, and is that of some fine sportsmen; but in how great degree it may be the result of tradition, and of practical experience in conditions that are past, must be discriminated. Certain it is, that with an 8 bore Double and the most perfect weapons of "Express" pattern, having a slight difference as to the missile, in strong and skilful hands, the heaviest bags of the great pachyderms ever made have recently been made in Africa; and what is true under the conditions of that continent, is as true in the Indian jungles, or on the Rockies of the other world. Sometimes mere theory may obscure the question, and accidental practice prove the point. Mr. Selous, feeling weak after an illness, took out his lighter weapon, simply because he could wield it; and with it he killed five elephants in succession, thus demonstrating what was till then a growing speculation. The magnificent skill of this great hunter may well be taken as a modifying circumstance in any consideration of this question, and individual aptitude must govern the decision. I am convinced that the reaction against very heavy calibre arms is genuine, and though, as a result, identified with personal skill,

is an increasing movement that will probably gain yet more impetus.

In this book it is not my purpose to promote discussion, but rather, in a matter of such complex consideration, to offer my own judgment, based on such experience as I have. I am led to recommend, then, as the best armament for a sportsman among great game, reducing it to the simplest proportions, that he should bear : 1 Double of 8 bore ; 1 "Express" of .577 calibre, to propel hardened conical missiles ; 1 "Express" of .500 calibre with hardened conical missiles ; and 1 smooth bore of 12 gauge, Double, one barrel a choke and the other cylinder, so that it can be used, in judgment, for shot, or with a hardened bullet for short range. These barrels should not be quite so thin as barrels are frequently made for home work, but should be fit for harder usage if it come, and they should be thicker and stronger from midway to the muzzle. The 8 bore, in good hands, should be all-sufficient for elephant, rhinoceros, buffalo, or gaur, which two last-named animals need heaviest striking ; probably the "Express," in very skilful hands, would be the same, and certainly those arms are, in my judgment, suitable to all soft-skinned game.

The deliberate opinion of Sir Samuel Baker* on this question is of interesting importance, as the cultivated consideration of a vast experience. The great sportsman considers that the adoption of the small bore for sporting purposes has been carried to excess, and that the impulse is in the nature of a

* "Wild Beasts and their Ways ; Reminiscences of Europe, Asia, Africa, and America." By Sir Samuel Baker, F.R.S., F.R.G.S., etc. 2 vols., 8vo. London, 1890.

fashion bearing us beyond the "bounds of common sense." Of course he is firmly sensible of the immovable importance of the weapon being adapted to the strength and stature of the wielder, and to its particular use in sport. So much is this last reasoning paramount that he declares against the attempt to perfect any so-called *general* rifle. The distances to be coped with are different on vast plains, and in thick jungle. The creatures to be encountered are various in size, strength, and capacity of offence. He affirms that with all consideration the .577 Express is the most fatal weapon he has ever used, and with proper loading is equal to "any animal in creation, provided the shot is behind the shoulder." Animals from a "buffalo upwards" are in a category by themselves. No larger bore than No. 8, with a charge of 12 or 14 drachms, can be necessary. A proper and effective penetration by the bullet must be considered as a principle; and that penetration must be arranged by varying the material of the bullet. The missile should not pass *through* the game, and so dissipate in waste a proportion of its initial force beyond the animal, which should receive the whole of the striking energy within its body. It is all-important to conserve this striking power, which is like a knock-down blow, so that its full force is delivered on the object struck. The hollow bullet from an Express breaks up into films of lead and disperses when it strikes the hard muscles of an animal. The effect on small and harmless creatures may be accepted, and used; but with dangerous great game its adoption is a great mistake. The bullet should be solid; if intended for large *pachydermata*, the metal should be of extreme hardness; others

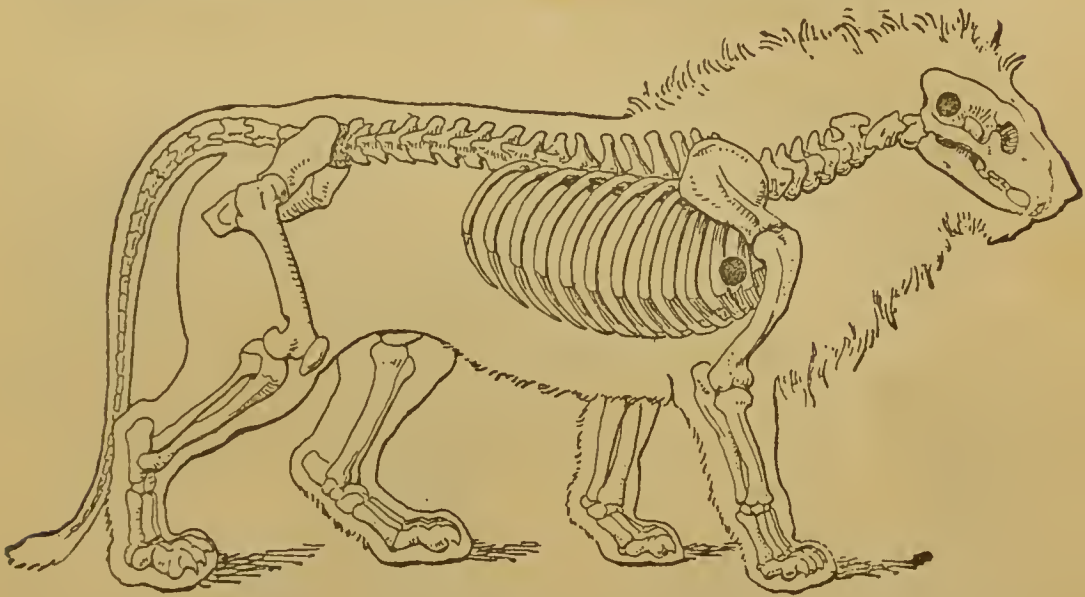
should be of softer metal. The cartridges should be coloured for distinction. If of pure lead, the bullet from a .577 will on impact assume a mushroom form, lacerating its course, but not passing out of the body, which receives all the striking energy. The difference to the effect of a hollow missile is enormous in this respect. A shot should be administered, whether in danger, or not, to kill at once, not to secure the same result by elaborate wounding. A few moments' delay in the result may be fatal. A sportsman should strike, not to wound, but to kill outright. Sir Samuel Baker, although condemning so definitely the use of hollow projectiles from the Express, particularly for dangerous game, does not deny that such animals have been frequently killed by those means. But he points out that the position of the animal is a distinctive factor in such case. A fatal shot may be delivered with unerring aim in such circumstances; but he maintains the conditions vary. He prefers the solid bullet of unalloyed lead. The similar missile of hardened metal, propelled with equal force, would penetrate too far, and passing through the creature would waste the energy that should be all bestowed on the stricken animal. This dictum may be modified, as to the hardness of the metal, in the case of buffaloes and thick-skinned creatures.

It is manifest, then, that details have much to do with success—indeed, are almost, in such circumstances, a condition precedent of it—viz. the temper (hardness) of the ball, shot, or missile, the quality of the powder, and the quantum of the charge. These points should have careful attention. Experience on the field is the only true guide (our own or others'), and experiments are only valuable according to the conditions. Although sportsmen among great game

have at all times had only such arms to deal with as they at the time possessed—sometimes arms that seem now quite primitive in comparison with modern weapons—the testing by sportsmen of such arms in real action is the only true test; indeed, eye and hand, as confident agents of undisturbed skilful judgment, are as important active forces for the result as the powder that utilises the best-made missile, or the most accurate bore of any index. The gentleman who can, without erring, do all that is prescribed to clamped boards and puddled clay on an English sward, might find his calculations disturbed by the short rush of a rogue elephant, the sudden deadly spring of a tiger, or the oncoming of a heavy buffalo, who has at last become convinced that only one course is open to him.

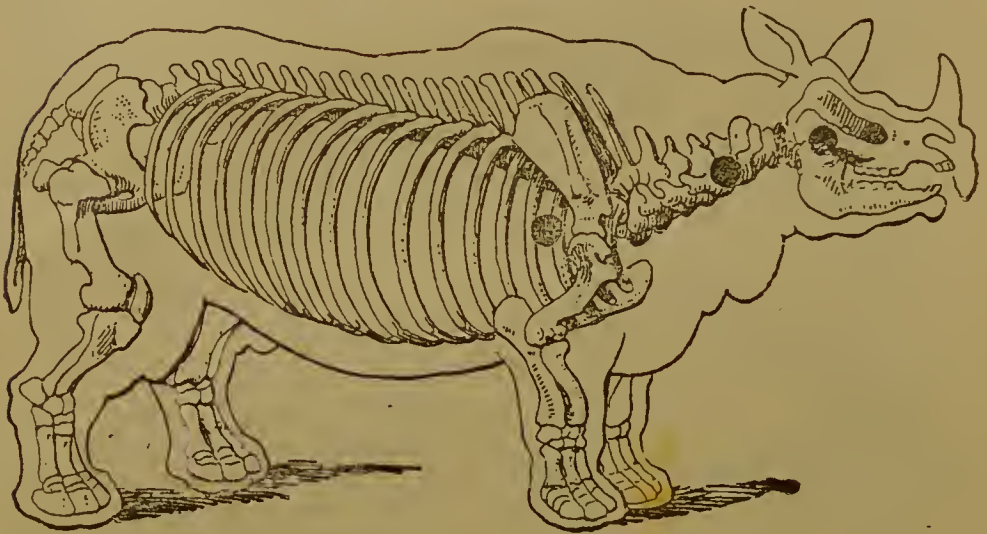
The sooner the sportsman realises that his operations with great game cannot be reduced to the symmetry of a game of chess, the better will he be able to best guard his own safety and create success for himself on whatever field he may turn his attention to. In fact, nothing in the way of arms can be of more value to him in those circumstances than quick apprehensiveness, delicate tact, strong, cool courage, an exquisite skill in the accurate use of his weapon. But underneath all this should lie a knowledge of what experience and investigation has taught us of how best to achieve our end; and one important phase of this knowledge is, *how and where it is best to strike the game in a vital part*, or in such way that the animal may be disabled. And here it must be remarked that no amount of book instruction will equal a small amount of experience; therefore it is well, when the game is *killed and comes to be cut up*, always to make a sufficient

special investigation as to the course of your bullet in regard to its effect on the vital parts. In order to make clear what is the position of these points, some diagrams of animals representative of species are given, and on them the points are indicated. It may be said generally that the brain and the heart are the real organs to injure with vital effect; but to these must be added the spinal column. Now with different species of animals, in various cir-



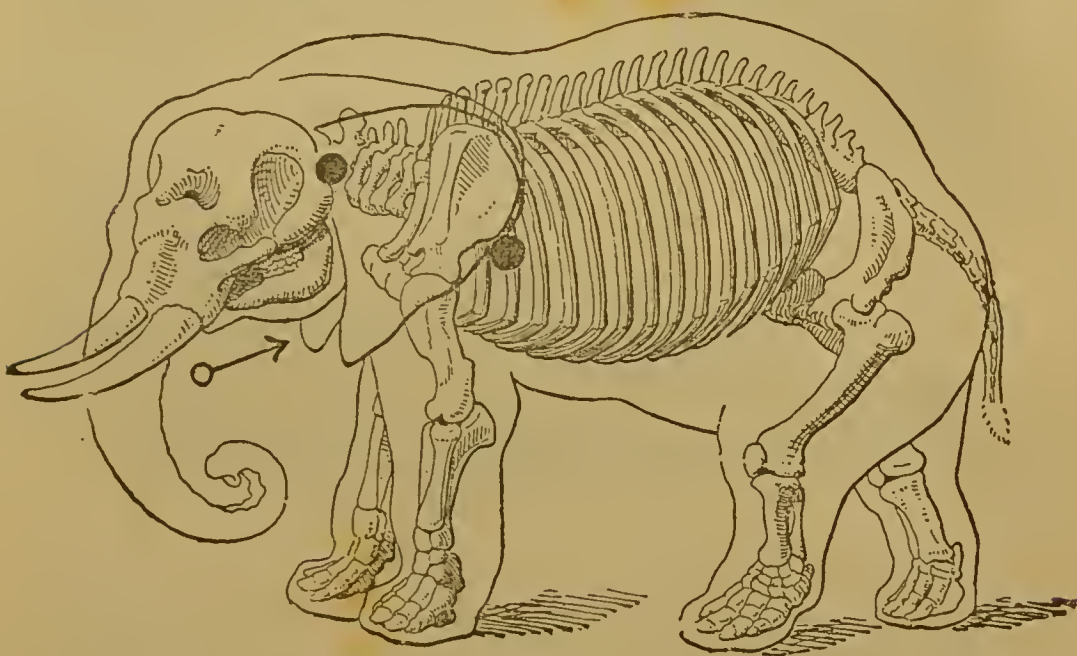
cumstances, the conditions under which these parts can be reached vary considerably. We may consider the animals in two classes: (a) those that are dangerous, (b) those that are not seriously dangerous. These may again be divided into (c) animals that are in natural condition unsuspicious, or quiescent; (d) animals infuriate, aggressive, charging. To speak first of the *Felidæ*. The place to hit a lion, if you are quite sure of your aim, as you may be if he is quiescent, is undoubtedly the brain. Now with tiger as well as lion, the brain is about the size of an apple, and small

in comparison to the bony structure; the brain-pan is located about three or four inches to the rear of the eye (*vide* diagram). The heart is also indicated, and when the animal is broadside on, it can be pierced by a shot behind the shoulder. When he is charging direct towards you, the best shot to deliver is a little to the right or left of the head, straight through the shoulder; by this you may perhaps pierce his heart, or possibly fracture the spinal cord; the bullet may traverse the body lengthwise with paralysing effect,



or it will—which is most important—shatter the shoulder-bone and prevent his deadly spring. The rhinoceros is best killed by piercing the brain, or by fracture of the spinal cord. The brain is surely found in the region below the ear. The sportsman's position in regard to the animal will determine the possibility of his reaching the spinal cord. The hide of the Indian rhinoceros is harder than that of the African species, but on the living beast is easily permeable by hardened bullets; still, where there is room for choice, it is best to shoot between the folds.

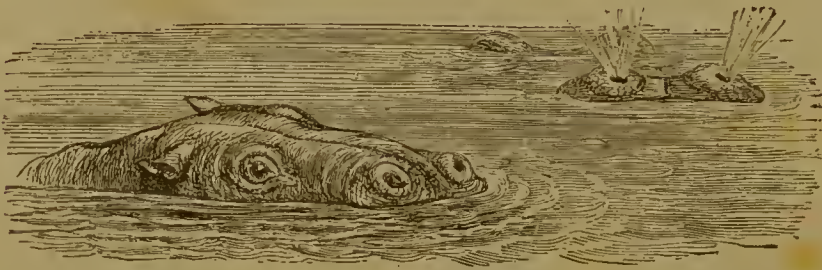
In certain circumstances the charge of a Cape buffalo or a gaur is among the most dangerous experiences of the sportsman. The same general observations apply ; but the neck and shoulder shot is to be preferred. In regard to the elephant, there is a great difference between the African and the Indian. The skull of the first is convex in frontal form, while that of the Asiatic variety is concave. The brain is wonderfully small in comparison to the bony matter by which



it is protected. The average weight of an elephant's brain is, say, nine pounds, which is but a fraction of the weight of the bone. The Asiatic elephant may be well shot dead while charging, if pierced in his forehead ; but a similar shot would not be efficacious with the African. The brain of these creatures is protected by a mass of cellular bone, which cannot well be pierced by a bullet, unless it be directed through the orifice of the ear. If he be charging towards you, the best shot is in the chest. The

position of heart and brain is marked in the diagram. When an African elephant is undisturbed, his great ear will furnish a sure direction for a deadly shot. Aim at the central portion of the outer edge.

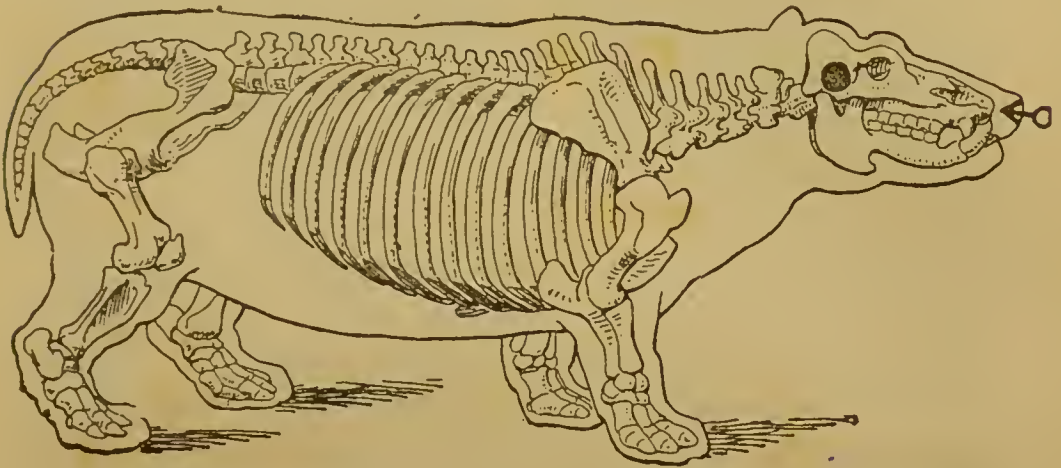
The hippopotamus if shot when he rises to the surface of the water, should receive the bullet up his nostril; that is the surest road to his brain. When stricken the beast sinks, and it may be an hour or two before his body rises; the time depends greatly on the temperature of the water. If he is shot on the shore, his heart should be aimed at behind the shoulder, half-way up his body in the line of his leg—the general rule. The seal should be shot in the brain, but the locality of his brain is very deceiving. It is



peculiarly back toward the neck, as shown in the drawing. The peculiar conditions under which seal is collected make extreme accuracy of aim important; for unless the brain be penetrated at first, the chances are that the creature plunges instantly from the ledge of ice or similar vantage-place on which most probably he has been resting, and however he may have been wounded, is uselessly lost. Too frequently numbers of these creatures are thus wasted by unskilful hunting.

For collecting some small animals and birds, shot-guns of selected gauge, throwing appropriate shot, are requisite. A useful gun for such purposes is of

410 bore, from which shot, or, on occasion, a bullet may be fired. Though the bore is small, it is sufficient for collecting purposes, as it inflicts a minimum of injury on those small or fragile creatures to which it is properly applicable. If the collector feels the need of a larger bore for birds on the wing, I recommend him to adopt 28 bore, or even 20.



A more humble, but in its degree an equally useful implement for the collector, and one which he can employ to remarkable advantage, is the blow-pipe. Some savage races use this weapon—for it can be made by skill veritably a weapon—with astounding accuracy of aim and certainty of effect. In taking a lesson from



them it is not necessary to misapply the means to any purpose for which the gun is more appropriate. But the collector will soon experience that, for many small specimens, he can use a blow-pipe with effect where he may not be able to use firearms. The implement is so simple and so easily constructed that the price of it is inappreciable. About three feet length of any straight metal or wooden tubing, $\frac{3}{4}$ -inch dia-

meter, through which a pellet the size of a marble may be thrown, will serve well, but an even longer tube may be chosen. The pellet should be of clay or any putty, rolled in the hand to easily pass through the barrel without too much windage. It should not touch the mouth, but be lightly placed just in the orifice, by stopping which with the thumb the tube can be conveniently carried loaded, muzzle up, ready for the most rapid use. To propel the pellet, the puff must be sudden and powerful. There is a proper way of effecting this. When a practitioner first begins to use the blow-pipe, it is a common error to eject the breath only direct from the lungs; he should acquire the habit of inflating his cheeks, so as to make a storage of wind, as it were, for each shot; that, added to the breath from the lungs, gives a force that will sometimes astonish him. The hand follows the eye in aim, and practice will often develop unthought-of proficiency. The particular uses of the blow-pipe are these: that its operation is silent and does not disturb, it is effective for small and moderate-sized birds not on the wing, it is easily manipulated in a wood, it is easily obtainable anywhere, and the ammunition costs nothing.

The question of traps, snares, etc., is one which more concerns the collector or trader than the sportsman. Many specimens can of course be collected by these means. A man's own taste will rule him in the adoption of them better than any precept or instruction. There are many ingenious devices used in America, Scandinavia, and other fields for the capture of game of all sizes, or the destruction of them rather. It will be found, however, that the ordinary gin, of whatever size it may be made, remains the really most efficacious

of all such contrivances. Implements, made on this principle, are constructed now of great power and large dimensions for the trapping of bears and other great game. In North America they can be easily applied with a certain success. But in Africa they do not work with such definite results in regard to selected game. There, round every camp or centre that has attractions for wild animal life, in profuse proportion to the superior animals that may be sought for, come the poor scavenging hyenas and other worthless lower creatures, and the ripened chance is that they fill the carefully set gin before it can close on the wished-for game for which its furtive energies are intended. If circumstances sometimes sanction the employment of such means, they are generally abhorrent to the true sportsman.

The employment of dummies and decoys for birds, and especially for shore-birds, is interesting and useful. Probably in all parts of the world ingenuity can adapt this resource in degree. As a rule gregarious birds are those most subject to the fascination, for such it is. To give examples in our own country — wood-pigeons can be attracted thus:



Any carpenter can make the shape of a wood-pigeon in rough; no legs need be shaped, but a stick should project from the lower part of the breast, so that the dummy can be fixed on the ground, or placed in a tree, as may be required; this figure must be painted in colour to represent the pigeon, and the paint must be "flatted," that is, not glossy. Such a dummy costs only four shillings and sixpence. It is astonishing how

the wild birds will come down to their haunts when they see this dummy there to assure them. In like manner plovers, gulls, and similar shore-birds may be decoyed. The decoy-duck is made buoyant to rest on the water, and is well known. Verisimilitude in regard to action is a great gain sometimes with these last-named, and is more important than mere details of feather.

An useful part of the sportsman's kit is a photographic camera. This sounds alarming, as suggestive of bulk and weight, and inconvenient dabbling with scientific *minutiae*, and perhaps dirty chemicals; but, in truth, none of those fears need be realised. The whole apparatus can be contained in a small case eight inches each way. The tripod-stand—an important part—is made to fold into a stave two feet long, about two inches thick. The sensitive plates are dry and prepared ready for use before leaving home; the inconvenience of properly using them, if there be any inconvenience in developing the picture, is reduced to a minimum, in no sense commensurate with the gratification derived or the value of the work. An animal may be photographed with its surroundings, just as it fell; the picture may be made a nucleus of interesting and most instructive memoranda, of obvious value because such details are too often forgotten, or the impression made by them effaced, just in proportion as we move from the spot. Photographic pictures of living *feræ naturæ*, in their native jungle or forest, have indeed been thus taken, and hundreds of sea-birds on the wing wheeling over an Indian headland, have been reproduced with the most accurate representation of individual birds, so that when magnified the picture presents the perfect specimen for our contemplation—our more leisurely examination in fact.

And remember, the undeveloped negative will keep good for months. The most portable plates are those four inches by three inches; they are sufficiently large for most useful purposes, though of course larger plates for larger pictures can be carried. It is all-important that the camera and apparatus should be good, the tripod true and firm; and in carrying such plates they should be done up in small parcels, so that, as each parcel is dealt with, the risk of spoiling such highly sensitive material may be reduced as much as may be. The above observations relate to glass plates. But an important process, in this connection, is the "Eastman" process of dry gelatine plates, securing, with extreme sensitiveness, lightness, freedom from breakage, and easy manipulation. And, still further, the Eastman film-carrying paper, which can be taken in pieces cut to sizes, or adapted in the small camera on a continuous roll, of say twenty-four exposures, passing for operation from the roller that holds the blank film paper to the roller that stores the same after it has received the negatives, to wait convenient development. One most important consideration remains to be insisted on, viz., the proper preservation of these highly sensitive appliances. They must be preserved absolutely dry. They take up the least moisture from their surrounding with astonishing sympathy, and to their destruction. They should be kept in a tight metal case, which is enclosed in a well-made wooden casket. These precautions are especially necessary when the campaign is in a cold or damp country.

The knives or other implements should be as few and simple as is consistent with meeting the real need efficiently; a tiger can be perfectly skinned by a

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skilful hand with a shoemaker's knife, price threepence-halfpenny. It is highly important that some preparation should be made for efficient and accurate record of scientific data, concerning natural features that are evanescent, such as colour of the eye, of a bird's bill and legs, etc.; but it is not too much to say that the whole of such apparatus may, by well considered ingenuity, be carried in the compass of a case whose capacity is measured in a few inches. It must be borne in mind before all things, that the value of any object secured and preserved depends on the completeness with which all its natural features are saved, as well as the condition in which they are kept. This is true in degree for whatever purpose the object be designed, but it is essential in regard to specimens for the illustration of natural history.

GENERAL OBSERVATIONS FOR THE COLLECTOR.

DIRECTLY a specimen is secured inspect the eye, and make a concise memorandum of its colour and any peculiarity of its appearance. A similar note should be taken of any colour on the bills, legs, etc., of birds (the brilliancy of which may fade), and particular note should be preserved of eyelids, the colour of them, if they have colour; and the same may be said of wattles and all such features of naked skin, because most frequently when these parts dry, the colours not only fade, but change sometimes absolutely; and the taxidermist at home may be led to a wrong conclusion. Never omit, and never defer the making of these memoranda, or instant decision on the necessity for it.

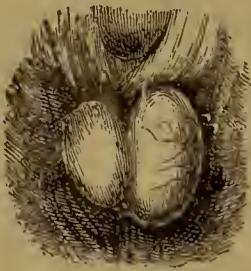
It is better that specimens of all warm-blooded creatures should be cold before they are operated on.

In dealing with birds care should be taken, directly they are shot, that the plumage be not broken, or injured by putting many of them together in a bag; and that the blood from one fresh specimen does not injure another. Instantly plug up with cotton wool the throat, nostrils, and all shot holes. Rare examples can

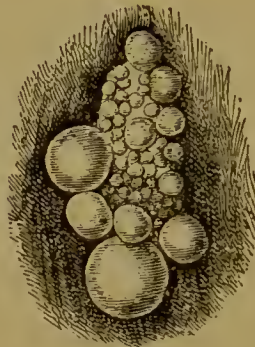
be isolated on a cone of paper, or otherwise, as soon as they are secured. It is often a scientific gain to save at least the *sternum* or breastbone, with the *caracoids*, the *furcula* (merry-thought), and *scapula* of birds, and the skull when the skin is not saved.

Pay particular and unvarying attention to the ticketing of specimens.

Tickets of convenient, durable material should be provided. Note thereon:—Date; a number; where killed; native name; scientific names; sex; habitat; habits observed, as to the eye, etc.; and peculiarities



MALE.



FEMALE.

of colour. Any other peculiarities, or facts noticed, To sex a bird, examine the inner regions of the loins, and if male mark it ♂, and if female thus ♀.

This question of ticketing, and the preparation of the ticket is all important. There is little, if any doubt that the brilliant colours on a fresh, healthy specimen, at the moment it falls, are always deteriorated, sometimes altered, under treatment by any preservative. Therefore, when the "colours" are noted, if possible, the collector should always put on his ticket a blot of water-colour pigment as near as may be, to reproduce the brightness and quality of the tint. This may need some ingenuity, but will be found not

difficult; a few cakes of water-colour and a brush take little space; the gain by this record will be great. The sexing is of much consequence: to determine it, where necessary, involves a slight dissection, when the appearances will be found as on page 20.

Corresponding tickets to those on the skins, etc., should be attached firmly to skulls, horns, bones, etc., and saved so that exact identification may be easy and certain. But, in addition to labels, skins should always be marked for absolute identification (owner-



ship) in manner following: With a proper awl puncture the owner's initials from the inside of the skin to the hair. Do this near the root of the tail on the hind-quarters, etc., and right through. The mark is indestructible, even if it seem to close up; it always becomes visible on cleaning the pelt. Let the punctures be close and distinct. When a head is saved make them on the scalp, or say on the neck, but always in one position; and in all future time you have an indestructible means of recognition, if

need be. This is a method of marking usual among skin merchants, and it can well be more widely applied.

For similar reasons, the horns of animals that are saved for ultimate decoration of walls, can be marked with initials in ink or pigment on the side that will not be presented to the spectator when they are in place.

But they should also be labelled; zinc labels wired on are the best. I call particular attention to this, not only for the obvious scientific value of it, but because so much confusion of ownership often occurs when a party of men shoot together; the distinctive marks or dimensions of specimens are mostly so slight, yet so important as to value, that the kindest endeavours to adjust matters, at the end of a campaign, often end in bewilderment and compromise, for in such affairs memory is treacherous.

Be as forethoughtful as possible in all operations; and be careful that no blood or grease, or juices from the offal, injure the feathers or fur.

It is generally far better to attend to the preserving of your own specimens, than to trust to native agents or servants; if you are compelled to trust to them at all, never sanction the use of lime in the materials they employ, even as a small constituent. Some natural substances (berries, etc.), used by natives, will change colour on specimens; the yellow ground of a leopard skin may be thus changed to reddish brown, etc.

PROCESSES OF PRESERVATION.

IN regard to the preservation for after treatment of the skins of great game, it would be easy here to quote many recipes of approved efficiency, and, in given circumstances, not open to doubt. But, for the particular conditions of the explorer, the *simplest* process that is safe and good is the *best*. I think that the materials carried may be reduced to two, viz. a quantity of dry powdered alum and a supply of spirits of turpentine. How these should be applied I shall presently explain.

There are two methods of preserving animals, or the skins of animals, on the spot where they are collected till they can be transmitted for definite treatment by skilled practitioners at home: viz. (1) by means of preservative applications, so that natural decay and the ravages of insects, etc., may be prevented; (2) by immersion and packing of specimens, on proper principles, in spirit, or in pickle. Convenience and obvious desirability will rule the adoption of either plan, and the application of it to particular specimens. Animals taken whole can be dissected; and examples of absolutely new species, or specimens of rare occurrence, may, at discretion, be transmitted thus with

many advantages. Generally pickle, or brine, preserves natural colours of specimens better than spirit.

And now in regard to the preservative applications. Since the first publication of this book, there has been exhibited a strong reaction against the use of preservatives, the basis of which is arsenic, and consequently of highly poisonous quality. For trophies and objects that are not protected by glass, it has long been my practice to use a non-injurious compound of my own invention, so that such danger as might be feared, under these conditions, from the use of arsenical paste might be avoided. I have now entered on the exclusive use of it, and its superiority in all cases having been proved, all trophies, great and small, in my studios are treated with it. I have ceased to use or supply arsenical paste, and I join my voice in deprecating the needless risk incurred by the use of poisonous preparations.

TAXIDERMINE, as I have named my quite efficacious preservative preparation, is made in (a) paste, (b) powder. For pachyderms and great game the powder form is used dry. It should be completely applied to the pelt, and rubbed carefully into irregularities and folds so that the whole surface be dressed. This is No. 2 Taxidermine. A similar powder, No. 3, is specially for birds; and there is Taxidermine No. 1, in paste. This last named is suitable for small mammals and for birds, for the more delicate skins, even the most tender. To these the paste should be applied first on the inner side, and afterwards, where requisite, the dry powder (No. 3), which is designed more particularly for birds. For the smaller specimens, the Taxidermine No. 1 is to be slightly diluted and applied with a hog's-hair brush; but the powders Nos. 2

and 3 must not be treated thus. This preservative is of easy application, is not dangerous to the operator in any way, and is effective.

PRESERVATIVES ON THE FIELD.—The skins of all mammalia, of fish, and of reptiles can be efficiently preserved for transmission home, by the simple dry alum process; but the skins of birds should be treated with Taxidermine. These resources, simple as they are, will be found sufficient, and they have this distinct advantage, that in the ultimate treatment of the specimen for permanent keeping, there are fewer difficulties to be surmounted by the skilled naturalist or the curer of skins. When salt, for instance, is used, or the lime of native Indian dressers (the most destructive in the world), or the vegetable curing of the Australian skins, there is often more trouble to take *out* of the pelt the deleterious substance, so that the process of decay may be stopped, than the specimen is worth. The skins of birds must not be treated with alum, or they become fatally brittle; the Taxidermine has a contrary effect, and softens the skin. All specimens or examples of either genus must be protected from the ravages of insects; and to do this the simplest means is the copious and judicious application of spirit of turpentine; but this must not be applied to birds, because it dissolves the grease that is more or less found in every bird-skin, and thus the metallic colours of plumage become permanently robbed of their brilliancy, and birds of white plumage are soiled by a yellowish stain. Where, however, there are no metallic colours to be preserved, the advantage of turpentine as a preservative may be gained, if it be applied lightly and with skill to the surface of the feathers, and not poured over the skin, as we might do with the skin of a mammal. The best way is to apply it with a saturated pad of cotton wool. But in this

connection, the powder called "Insect Death" must be mentioned, as its usefulness to the naturalist-traveller cannot be overrated. It is an inodorous and efficacious powder not destructive of anything but insect life, and can be shaken from a specimen in a moment. Bird skins when properly saved can be amply dusted with this on the feathers with every confidence, and it does not inflict the odour of turpentine. If white birds are treated thus, be very careful that the specimens are kept from damp (as indeed all such skins ought always to be), or there may be liability to stain. "Insect Death" is very valuable to the naturalist who stores specimens for keeping or for transport. In fact, it is a pleasant and cleanly protection for fur and feathers, and to that end it should be kept and judiciously applied. I have never found an insect on a specimen dressed with this powder, after an experience of many years. It is particularly efficacious against moth.

THE ALUM PROCESS.—The material to be employed is powdered burnt alum, unless Taxidermine No. 2 can be obtained. When the skin of a mammal has been removed, the very first thing to do, without loss of time, is to "flesh it," which means to carefully clean the pelt of all superfluous flesh or fat. This having been done, spread the skin hair downwards and peg it out flat, unless you have a frame or other better mechanical means of stretching it. The state of the weather is a consideration in this work. During the rains in India the air is charged with moisture, and it is difficult to dry anything by simple exposure. At such time, in any country, a skin pegged out would probably be spoilt, and the hair slip. It is more advisable, then, to use "pickle," described below. In hot weather

pegging is easy enough. It should be managed neatly, so as not to injure the skin by tearing large holes. It is a good plan, when available, to get a few dozen long iron nails made with a bent loop at top for conveniently stringing them together when not in use; they cost very little anywhere, and are neater in use than wooden pegs. Of course of small animals in some portions of which the bone is retained—for instance the leg—the skin must not be pegged out; and indeed where means exist of avoiding it, do not “peg out” at all, as the skin is always somewhat injured by that process, and sometimes is irreparably torn, therefore avoid such injuries if you can. The fact of drying induces shrinkage; so arrange your skin that as it shrinks it cannot wrinkle into folds, for in those, if anywhere, the ravages of insects will lie. In cold climates, perhaps, pegging and stretching may be avoided altogether. The skin having been spread out flat with the pelt uppermost, proceed to rub in the alum or Taxidermine. This should be done with the hand carefully to cover every portion, and the supply of preservative should not be stinted. It must be particularly applied to the lips, ears, feet, and other fleshy parts that have been prepared in skinning to receive it (see p. 37). The whole pelt having been treated thus by hand, sprinkle it with the powder till it is regularly and well covered. The skin should be left thus until it is dry, and it will be found that the astringent applied will dry it with rapidity. But during this time it is most necessary to watch it well, so that if there appear a tendency in any part of it to “taint,” which would cause the hair to “slip” or come off, the preservative may be instantly applied on the hair side as well as the pelt wherever requisite. When the skin

is dry it must be conveniently folded, hair side inwards, for packing, that is if it be of large game and requires folding. First turn the hair side up and pour turpentine freely over it till the skin is thoroughly anointed. Note that with long-haired animals the turpentine reach the roots of the hair; sprinkle the pelt side; but it is not necessary to anoint that so fully as the fur. It is well, when convenient, to put some dry material in the folds to prevent contact between the inside of the skin and the fur; and, as occasion may serve, the skin should be unfolded and inspected, and more turpentine or preservative applied to parts if necessary. In the process just described the astringent powder is applied to preserve the skin, and the turpentine to protect it against insects. The ravages of these pests in a hot climate, such as India, are indescribably vexatious, and must be carefully guarded against. The principal of all the marauders is a beetle about a quarter of an inch long, of a dark dirty colour with a transverse band of dull yellow; he does not often fly, being generally more busily engaged on carefully collected skins; but he can fly. His common name and his scientific name are "The Bacon Beetle;" or *Dermestes Ladratus*; but as



he is so veritable an enemy it is best not to rely on his cognomen, but on instant recognition for immediate extermination, therefore his portrait life-size is given on this page. Now this insect does not like any spirit; but the one spirit he really dreads as fatal to his constitution is turpentine. In the colder climates benzine and similar spirits are sometimes used and with efficacy, but

these evaporate more rapidly in warmer temperature, and turpentine, if only because of its less rapid evaporation, is at all times to be preferred. *I have sometimes unpacked trophies to discover the hair entirely removed from the pelt by the exertions of the Dermestes; and in like manner I have received skulls in London that have been imperfectly cleaned of flesh, from which I have shaken hundreds upon hundreds of fattened lively specimens. I gave them the turpentine they should have had in India.* Sometimes they will recover activity after the milder influence of benzine. The process described above is quite sufficient for *Pachydermata*. All skins should be well looked after at night. During the darkness, animals of various kinds, including half-starved village dogs, frequently lurk about a camp, and nothing comes amiss to their hungry maws.

PICKLE.—Another process that is frequently most convenient on shipboard, or, according to the conditions, is that of “pickling.” The skin having been removed from the carcase and cleaned, instead of being laid out for drying, should be thickly covered over the flesh side with powdered alum, the lips, eyelids, feet, etc., being particularly treated; then it should be folded in a convenient form, and thus be immersed in a barrel of brine, or what is technically called “liquor”—in fact, parts of alum and salt dissolved in water, in the proportion of 6 lbs. of alum and 3 lbs. of salt, sea salt if possible. Dissolve both in a small quantity of hot water sufficient to make a gallon, and let the liquid cool before the specimen is immersed. The skin must be sweet and fresh at the time of placing it in pickle, or the operation will not succeed. The vessel must be kept closed. A number of skins may be placed in the same barrel, which is then

ready, when quite filled, and closed, for storing, or for transit. If thought more convenient to make the package lighter for travelling, the skins can, when they have been thoroughly pickled for a few days, be taken out, spread open and dried, then repacked. This,



however, is an operation requiring obviously great judgment, as if it be imperfectly carried out the consequence may be ruinous.

A conspicuous exemplification of the advantages in this process of brine-pickling, was afforded by the great elephant trophy brought from South Africa by

H.R.H. the Duke of Edinburgh. In this case the system was adopted in manner following: The entire skin of the mighty beast was preserved. The animal was undoubtedly one of the largest examples ever brought to this country of the African species. His height at the withers was 10 ft.; from tip of trunk to tip of tail, 23 ft. 5 in.; girth, 16 ft. 6 in.; from top of head to end of trunk, 11 ft. 3 in.; circumference of head, 10 ft.; from ear to ear, 9 ft.; length of ear, 4 ft. 6 in. The skull and tusks weighed more than 3 cwt.; the skin of the head when taken from pickle, weighed 3 cwt. 6 lbs. The weight of the whole skin when taken from pickle, was 20 cwt. 7 lbs. The weight of the entire elephant in the flesh was 4 tons 8 cwt. 4 lbs. On the field the skin, having been duly prepared, was folded in this wise: the flanks with skin of legs and feet were folded inwards, each half-way, so that the inner surfaces or flesh side were outwards; then the skin of the head was in like manner turned back, the trunk being disposed of longitudinally down the centre between the edges of the flanks; and the tail end with nether extremities was similarly folded back to meet the trunk. The whole skin was then rolled as tightly as possible round the head, and carefully tied at both ends of the bale. In this condition it was placed in a great barrel which was then completely filled with liquor, and properly coopered for transmission to this country. On arrival in London, when the head of the barrel was removed, the perfect success of this mode of transport was at once apparent. There was no unpleasant odour. On taking out the mass and unfolding the skin, it was noticeable that every part of the surfaces had been properly acted on, and there was not a single tainted fold. At that time it had

been upwards of a year in the barrel. The old pickle was removed, the skin was refolded and restored to the barrel with a supply of fresh liquor, and the cask was re-coopered. In this manner the skin was preserved for upwards of three years more, until the decision as to how this great trophy should be treated was arrived at. The magnificent head was modelled and mounted in the Ward studios, and is now in Clarence House ; the feet (which supply an index of his size) were utilised for ornamental purposes, while the hide was cut up and converted to use; a considerable portion being made into walking-sticks, that formed appropriate mementoes.

The skulls of large mammalia are always removed from the skins. It is important for the proper preservation of the skulls of *Felidæ*, that they should be protected from injury to, or loss of, the teeth. This is best done as follows: When the skull has been boiled (not too much or it loosens the sutures) or soaked, and properly cleaned, and the teeth painted with wash about half-an-inch thick, it should be tied up in a calico bag and placed in a separate compartment of the packing-case designed for it. Stuffing should moreover be put into each compartment to prevent the specimen from being shaken, and so injured. The wash for teeth mentioned above can be well made of wax; as the tooth dries it often splits up, the bony structure as well as the enamel; wax tends to prevent this action.

When time and circumstances permit, there is another method of cleaning large skulls that may be useful. Tie a rope round the horns or antlers to secure them to the shore, and cast the skull into a stream or tank. When the horns (which have cores) become loose they can be removed and cleaned, the skull being left in the water until the flesh decom-

poses and it can easily be scraped away. Ordinarily, however, it will be found that numberless small fish will be at work on it night and day, and will clear it well of all extraneous matter, if they are allowed time enough.

It should be mentioned, in case of need, that many strong mineral and vegetable astringents can be used with more or less success besides Taxidermine, alum, or salt; such as saltpetre, powdered green vitriol, or sulphate of iron, boracic acid, etc. Carbolic acid, diluted with 10 parts of water to 1 part carbolic, is very useful with big game. Of vegetable substances, gum kino, oak bark, willow bark, catechu, powdered nutgalls, or any such material rich in tannin, are available; and strong spices, or strong tobacco powdered, will keep off insects. A large skin, in default of anything better, may be plentifully dressed on the inside with wood ashes. The virtue of wood ashes really consists in their detergent properties; for, containing as they do a large proportion of potash, the fat is thereby converted into soap, and sometimes in this condition is immediately brought away by the hand, or the scraper, and as a preservative, excepting under difficult conditions, the effect is cleanly and good. Remember that there is a difference in ashes, depending on the wood employed. Oak is one of the best.

A METHOD OF TEMPORARILY SAVING SPECIMENS (Birds) is by using benzoline, to be obtained cheaply almost anywhere. When the bird cannot be skinned directly, but has to be delayed in skinning, cut the bird, say, under the wing; then open its mouth and immerse the specimen in benzoline to permeate it well. This will keep it safely till it can be skinned properly, if the air be excluded.

FISH.—The proper preservation of fish is undoubtedly a matter of some difficulty. Naturalists are perhaps not generally aware of how few examples of foreign fish reach this country in a condition that admits of effective after treatment, or how special a branch of the art it is to set them up effectively and well. The common processes are : (1) to plunge and bottle them in spirits ; but we all know the effect of that on the evanescent colouring, as well as on the natural contour of the specimens ; (2) when they are skinned (see p. 67), to apply dry powder preservative—in default of Taxidermine No. 2, powdered alum—to those parts where the flesh cannot be perfectly removed, so that it may be dried, and to apply Taxidermine paste on the inside, for preservation of the skin.

REPTILES.—The skins of crocodiles, alligators, and the larger reptiles having been removed (see p. 70), must be manipulated as follows : Clean them of all flesh as perfectly as you can ; this, however, cannot be done very completely about the head or the feet of a large example, and to those parts Taxidermine, or even alum powder, must be applied in plenty to dry up the flesh as well as may be. The roof of the mouth can be cleaned, and the tongue must come away. With smaller specimens that can be skinned over the skull to the lips, a similar application must be made where it seems necessary. To the inner part of the skins some Taxidermine No. 1, or wood ashes may be put ; but, really, the preservatives are not nearly so necessary as in the case of warm-blooded mammals. Indeed turpentine that will protect them from insects will afford nearly all the protection they need. The skin can be rolled or

folded for transmission. With snakes, the skin dried flat can be rolled from the tail like a ribbon, the belly side inwards on account of the scales (see p. 69). Small specimens of any species will go in spirits. Carbolic is a useful agent in cleansing all reptiles.

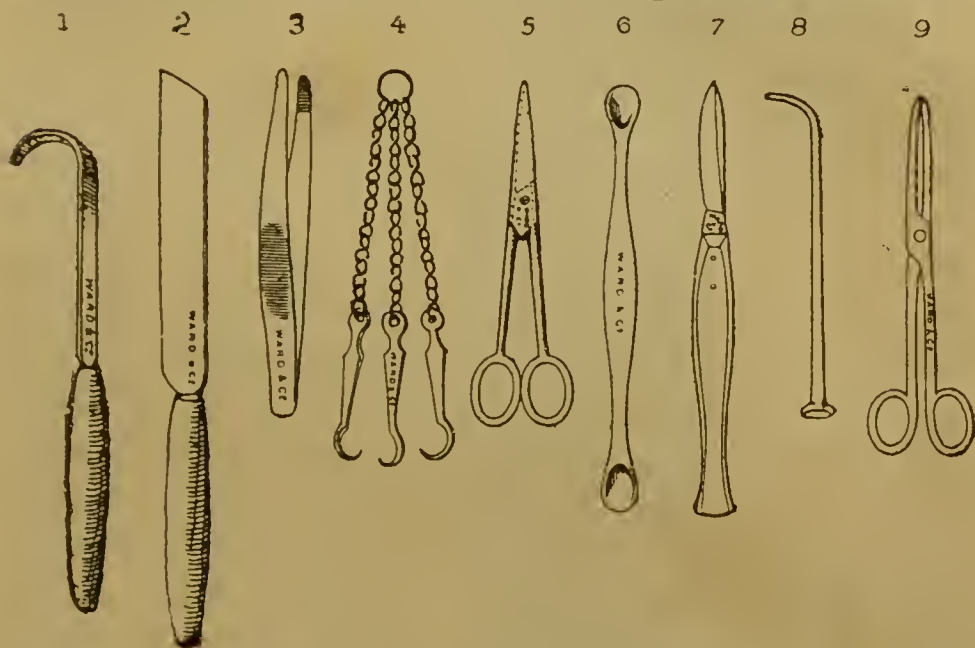
IMMERSION IN SPIRIT.—Something must be specially said about this mode of preservation, for there is absolute necessity that it should be *properly* carried out, or nearly all the advantage of the resource is neutralised. Either fish or reptiles, or even birds, that may be sent home in spirits, should be treated in this way: First provide a tub, or other convenient vessel, full of the spirit, wherein the specimens can be put as a preliminary measure, so that the mucus, water, etc., may be drawn out of them. Before placing them in this a moderate incision should be made, with as little disturbance as possible, in the belly, so that the spirit may permeate all parts. Keep the specimens in this spirit from a week to ten days, then transfer them to fresh spirit, and let them remain in that for about two weeks more, before finally you remove them to the vessel or vessels of spirit in which they are to be packed for the remainder of the journey: Reptiles, being less watery than fish, generally require only one change. The first tub of spirit may be used for more than one set of animals, but will of course decrease in strength by the addition of the water drawn from them; the second spirit should be stronger; the third quite strong enough to be readily inflammable. They will then be safe for more than six months, and can be sent home. Proof spirit, diluted about one-half with water, is perhaps the best to use, but rum or gin serves well. The specimens can be packed for transmission in great numbers thus:

Wrap each fish or reptile in a piece of linen or cotton rag, and arrange them to rest closely in an appropriate vessel that can be then filled completely with spirit. A wooden packing-case, well lined with tin, that can be hermetically soldered up when quite full of the liquid, serves well. Of insects, beetles can be transmitted in spirit. The native spirit, "daru," called by Europeans "native liquor," and sold in all the native bazaars in India, will do very well instead of rum, etc., for preserving reptiles. It is very cheap. Besides these, or when they are not attainable, benzoline may be used with judgment.

INSECTS.—The majority of insects having been properly stored as directed (see p. 70), require little more than a supply of camphor, or cyanide of potassium, to protect them from decay. Mites sometimes appear in them as an evidence of taint, and then the best means for destroying the intruders is benzoline. But some very large moths, butterflies, and beetles require a different treatment. In such cases the body must be opened by a longitudinal section on that side not intended to be displayed, and as much matter must be removed as can be got away without impairing the specimen. The cavity thus created should be completely dusted with Taxidermine No. 3, and the incision must be neatly and skilfully closed over it; a small but sufficient piece of cotton wool can be introduced to preserve the shape.

SKINNING AND PREPARATION.

THE apparatus necessary for the skinning of animals is really very simple, and I strongly advise that it



should be kept to the simplest proportions. It is the skill with which the knife is wielded that is more important than the best of knives. A shoemaker's knife, a small saw, a pair of pliers, and perhaps a pair of cutting pincers, are all that are required for operating on the most important game. Some small implements for the lesser specimens being added, this is all the kit that need be carried. To understand the principle of the thing, and to adapt that principle in practice with ingenuity and judgment to the particular conditions that present themselves, is the true learning; and to

cumber the mind with numberless minute memoranda of other travellers' experiences in emergencies that may never be our lot, is an useless task. Enrich the recollection with all that experience brings to bear on the subject in deductions, to illustrate or to inform, but not to copy simply of necessity. The best operator is he who does what is right to carry out his purpose, carefully, on true principles, according to the means at his command, and the advantages of surrounding conditions; he who simply copies what others have done in given circumstances, forgets, probably, the conditions under which they succeeded, and that the conditions are not necessarily the same in his case. Let a man be master of the occasion and his position will be good, even if it is different from any that has gone before. Now what has to be done is simply this, and the remark applies equally to large or small game, mammalia, birds, reptiles, or fishes. A beast having been slain, or a specimen secured, we have to remove the skin, preserving the exterior natural features, as completely as possible; then the skin—cut as little as may be—because it would otherwise decompose under the influence of climate, etc., such decay must be averted by the application of preservatives, and when it is packed so that it is protected, the trophy may be sent home. But the preservative and precautions necessary in an Indian or African climate, may be modified in North America, and in highlands or lowlands, in forests or exposed positions. There is, in fact, no preservative, or book recipe, or tale of other persons' experience, that can compare in value to quick true judgment, and cultivated common sense. I shall describe in as much detail as appears necessary the skinning and preparation of one animal represen-

tative of each class; and my reader must trust himself to adapt the practice by the light of his own judgment to the specimens, large or small, with which he may have to deal; and he will soon find his practice surpass in usefulness the most compendious (and cumbersome) book of recipes and directions.

LARGE GAME.—

When the great game is secured, and is ready for the operation, first turn the animal on its back, and stretching apart the fore and hind legs, proceed to remove the skin. In all cases where the skin is wanted entire, this is best done by making an incision from the corner of the mouth, through the medial line of the belly to the extremity of the tail; but in doing this cut only just through the skin, and be careful not unnecessarily to injure the carcase, or especially the intestines; next make lateral



incisions in order to strip the limbs; for the forelegs from the edge of the central incision through the armpit, along the inner side of the limbs, the line of incision inclining slightly to the outer portion, in order that the seam may be less perceptible when the perfect specimen is mounted. A like process through the groin is necessary for the hind legs. These incisions thus made leave the skin in form of tongue-pieces over the breast. First apply the knife to these points, and



detach the skin round to the spine and along the tail. In doing so it is necessary to clear the limbs, and great care must be taken to leave intact the natural features of the foot. The last metacarpal and metatarsal bones may be left in the skin, whether with the smaller specimens of *Felidæ* or *Cervidæ*; but in the big animals it is better to remove them altogether. Now turn over the carcase, and draw back the whole skin over the head, exercising particular care in separating the ears

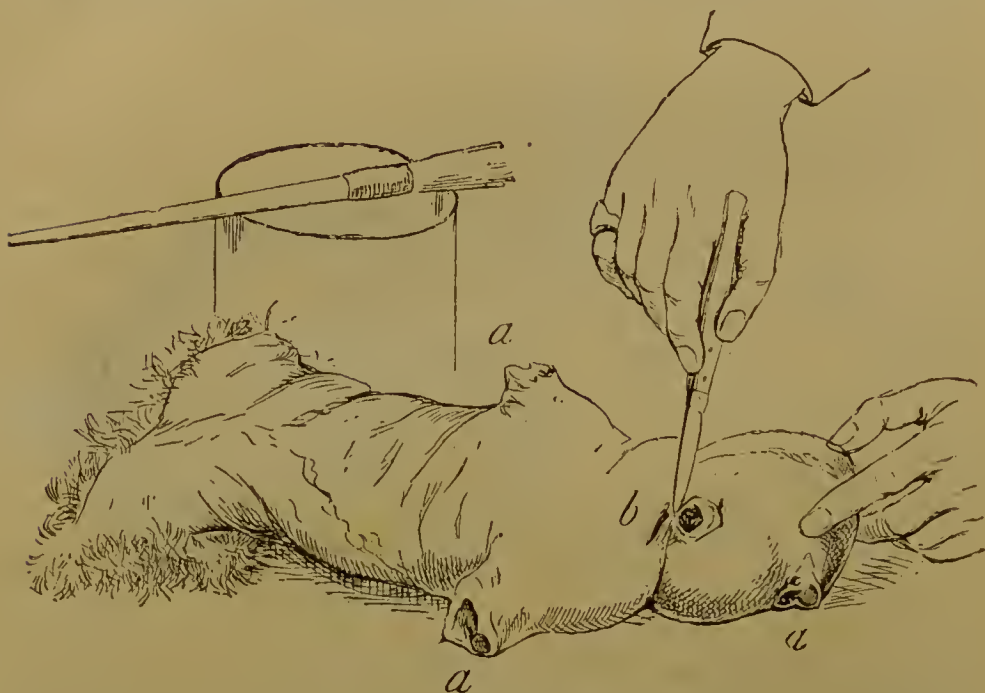
and the eyes from the skull. Similar care must be taken as to the lips, for if the rim of the eyelids be severed by the scalpel the injury spreads in a remarkable manner, often so badly as to render the damage seriously conspicuous. The ears should be parted from the skull close to the bone, or the lower structure of them will present too large an aperture. The lips must be cut off close to the gums. Having thus taken off the skin, it must be cleared of all superfluous fat and flesh—and all the fat and flesh is superfluous.



The cartilaginous portion of the ear must be turned through. The lip must be treated thus: Pass the knife between the mucous lining and the outer skin all round the mouth, so as to admit of the preservative penetrating this thick portion of the specimen completely. The eyelids and the feet must each be treated in a similar manner for the same reason. Be careful that the claws or hoofs are well kept.

A great deal of the description above well applies to the skinning of a fox's head, which I particularise

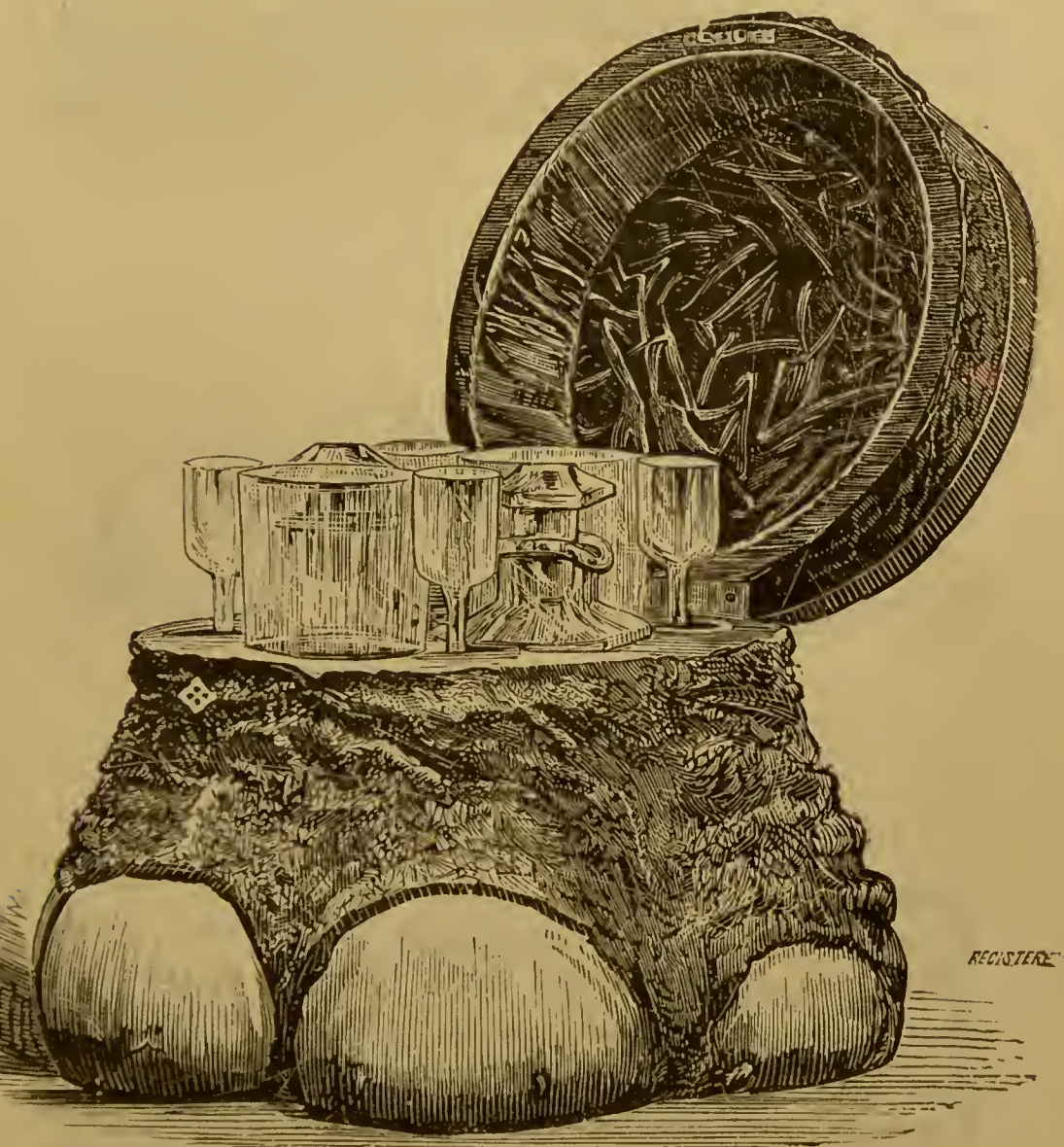
because it is an operation that very frequently exercises the amateur naturalist, and it well serves to exemplify the proper treatment of most hornless animals. The last illustration shows the process of turning back the skin so that the cartilage of the ear may be operated on. The succeeding block is designed to explain the delicate operation of treating the eyelid—a part of the work over which the greatest care must be taken. The removal of the lip at its junc-



ture with the gums, and the cutting of the nostrils, are treated in the illustration on page 44.

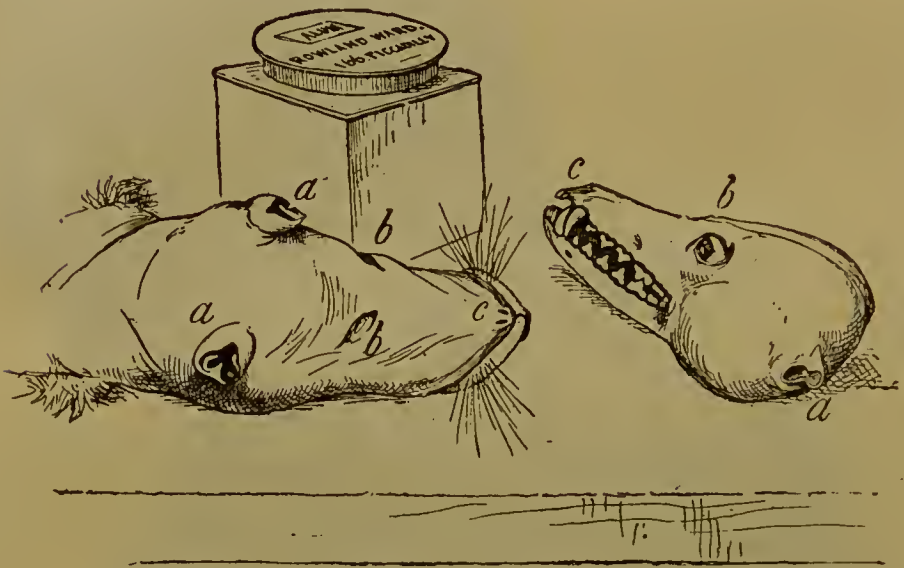
A fruitful source of trouble to the sportsman in Ceylon, India, Africa, etc., is the proper treatment of an Elephant's foot. This feature is a recognised trophy, as well as the head, because it is a gauge of the size of the specimen, and because in ordinary circumstances the skin of this mighty beast is so difficult of transport, and although it can be converted by skill

into innumerable articles of domestic utility, the value of it in private hands is not always appreciated. It is different with the foot, excepting that it is particularly adaptable for conversion into useful articles, without impairing its natural history significance.



ELEPHANT'S FOOT LIQUEUR STAND. FROM H.R.H. THE DUKE OF
EDINBURGH'S COLLECTION. ROWLAND WARD, F.Z.S., fecit.

The foot should be severed at least eighteen inches from the ground—that is to say, the skin should be severed. Separate the skin from the flesh, and bring the casing of the foot away in one piece. Clean it carefully, and apply powdered preservative both inside and outside, then place it to dry in the shade, taking good care that the skin does not fold, and is in all parts accessible to the air. Although not absolutely necessary, it is desirable that the skin dry in natural



shape. It is a good plan to insert a hard core—a flower-pot, or something like it may serve—round which you can press dry sand, so as to distend the skin to as near as may be the natural shape. The sand may be changed as required for the drying. It is important that the foot be protected from insects, and to this end, when the specimen is quite dry, saturate it as far as possible with turpentine. Rhinoceros and Hippopotamus can be treated in the same way.

The above treatment of a natural feature may serve as an example of such adaptations, but the purposes to which portions of similar trophies can be put are very various and interesting. Many a sportsman, when he has arrived home, has wished he had recollected as much when on the field. The hides of Elephant, Rhinoceros, Hippopotamus, Tapir, and of all the pachyderms, can be treated for a variety of useful purposes. If all the animal cannot be saved, a part may be.

The shields or plates of a Rhinoceros, the thick portions of his hide between the folds should for such reasons be brought away entire, and they can be made into table-tops, keeping their shape, into trays, caskets, etc. By a process to perfect which I have worked for many years, and have now patented, the prettiest and most beautiful surface effect can be obtained under an exquisite polish. When such portions of hide cannot be transported whole, the skin may be cut into strips about 27 in. wide, and sticks, whip-handles, etc., may be made. The applications are infinite. It must be remarked, however, that sticks, made thus, are beautiful indeed, but are not well adapted to all purposes; because, if you bend them, much of their beauty—they look like semi-transparent amber—is deteriorated by an opacity that clouds their lustre where the bend comes. They are indeed more ornamental than useful, but for trays, boxes, cabinets, tables, etc., the material is beautifully applicable.

One of the most conspicuous applications of my patent process that has been made, is the case of a large table recently produced by me for presentation to the Prince of Wales. The exceptional piece of massive hide obtained was African, and was got from the

Kilima-Njaro fields—a magnificent example of animal growth. It was nearly 4 ft. in diameter when made into a circular shape. It was prepared, and gave a lustrous surface like fine clouded amber, with transparent portions. The edging of this table was made out with a cornice of rough hide on which the epidermis remained, presenting a very appropriate framing to the lustrous material. The supports were formed of polished Rhinoceros horns grouped. They were imposed on a base formed by the polished section,



complete with its bark, of a magnificent coniferous tree, 2 ft. 6 in. in diameter.

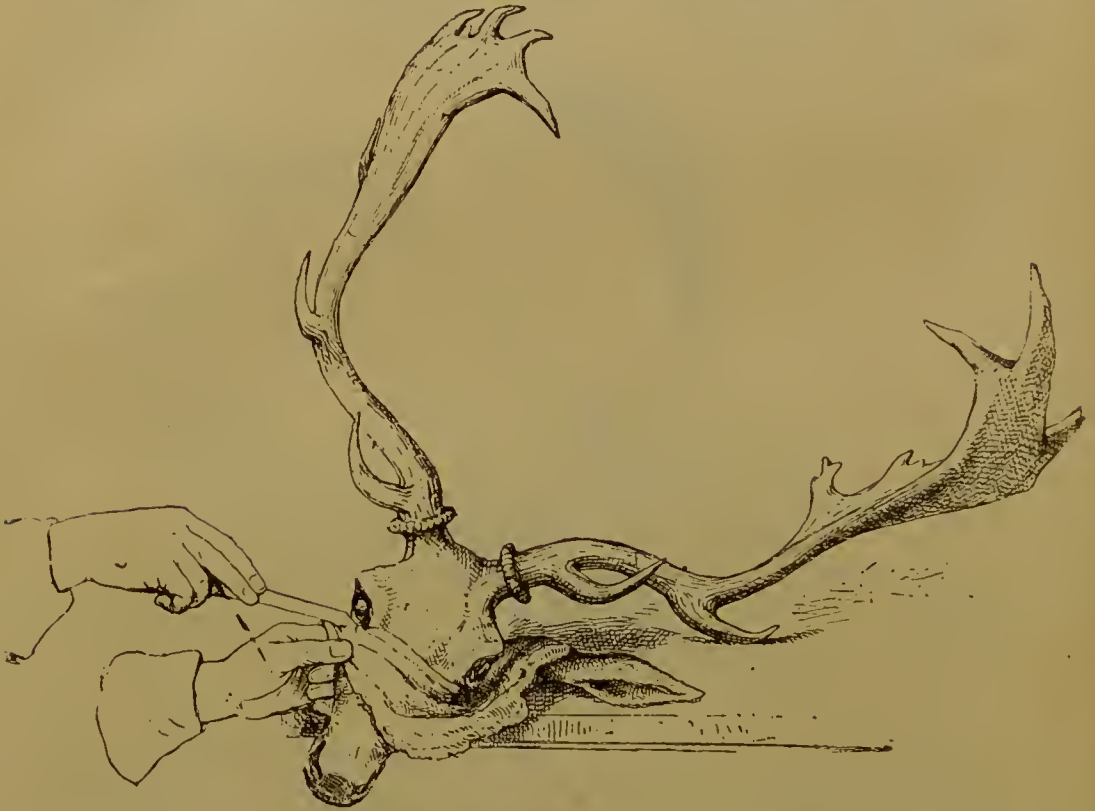
Something must be specially said as to the head. It frequently happens that it is desired to save the head for preservation as a trophy, while the other part of the skin is either abandoned or saved for a rug. Heads with antlers or horns are prepared for preservation either in the naked bone or to be set up to imitate living nature. For this last, care must be exercised to take the skin of the whole neck. Make

the incision up the back of the neck, over the head between the ears until the horns are reached; if they are wide apart cut between them right and left, carrying the incision right round the burr of each horn. In separating the skin from the burr the knife should be used neatly with a plunging action of the point, so that not a particle of hair or skin be sacrificed at this part. He is a bad workman who leaves a morsel of the skin attached to the bone. In clearing the scalp be very



careful not to let the knife injure the skin; the knife must be deftly used. But there are other features with which this skill is more important still—to wit, the eyes, the nostrils, and the ears. The delicate skin round the eye is nearly hairless; it must not on any account be torn or jagged. In a head the eyes and the nose are the most prominent parts, first claiming notice. In treating the nostrils and upper lip operate from inside the mouth; sever the lip neatly high up the gum, over the teeth; and in like manner detach

the lip below. The skin will present in these portions a particular thickness, into which, from the inside, a neat midway incision must be carried all along, so that the preservative may penetrate and be carefully rubbed into the cut to the end that these parts may be saved properly. The alum process is best; but if more convenient the skins may be preserved in pickle (see p. 29). Clean the skin well of all fat and flesh; rub in the



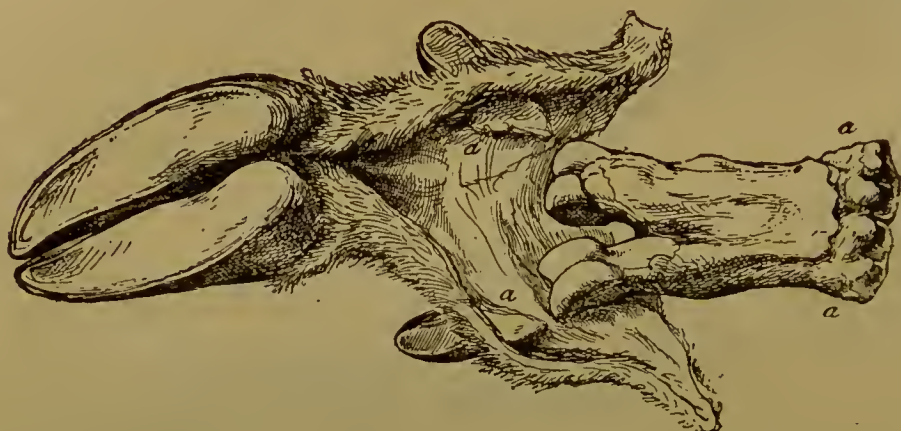
alum, but not on the outside of the nose, and hang up the skin to dry. If there should appear any likelihood of the short hair round the eyes and nostrils slipping, apply some alum judiciously there. Be sure to save the lower jaw. When the head is of Wapiti, and is to be set up thus, it may be a matter of great convenience to pack the horns, and to do that the skull, to which they are attached, may be sawn in two, longitudinally, by which much space may be gained. But if the trophy

is to be mounted in the naked bone, this severance is quite inadmissible, and it should in no case be adopted with smaller heads, which are, in fact, almost destroyed by it, the skull is thereby weakened, and at the end of the journey broken to pieces. Such a state of things necessitates great extra labour and expense even if



the injury can ever be repaired. North American trophies are frequently received in a deplorable condition from this sort of injury, by which neither convenience nor economy can have been secured. For preservation in the bone, the flesh may be roughly taken off, and the skull be cleaned by boiling, by

maceration in a stream, or by burying it for a proper time in an ant-hill. But be sure and keep the specimen from dogs or other animals. In regard to the ears, when the skin is off, and you have separated the cartilage close to the bone, trim it neatly with the scissors of all that is not wanted inside, but do not take too much, or an unsightly hole may appear when the head comes to be mounted. Next insert the thumb and finger from the inside so as to separate the inner from the outer skin, forming, as it were, a flat bag ; do not carry this separation too near the edges. Into



the division preservative must be carefully put. It is my practice to fill the space with composition, which keeps the ear for ever the proper size and shape. The old way of sewing a piece of card on the outside is not good, it allows the skin to shrivel and shrink, and its natural beauty is seldom or never to be restored. Some horns (as *Ovis Ammon*) have "bearers," or a bony core, from which the horns may be detached and packed separately ; in this instance the skull should be kept, and so much of the bearers as seems superfluous may be removed.

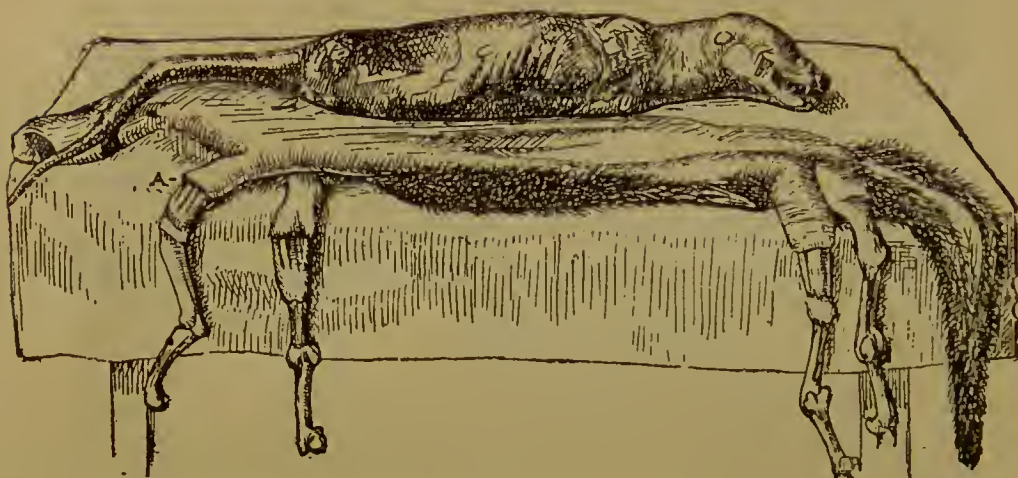
Another attractive trophy is the foot. Whether

it have a cloven or solid hoof, many most useful and ornamental things can be made from this feature. To save it properly, the skin should be opened longitudinally at the back, but not detached from its juncture with the horny substance. All flesh, muscle, and sinew should be removed, as well as the bone which is not required. In the illustration the bone is depicted as it comes away from the hoof.

SMALL MAMMALIA.—These can be preserved for dissection and preparation, when necessary, in spirit, or, as described in the cases of large skins, in liquor. When they are treated thus, incision must be carefully made in the trunk, and the intestines, with as much blood, mucus, etc., as possible removed; the liquid will then penetrate, and the carcase should be soaked in spirit or liquor for some time, in order that the juices of the body may be drawn out into it, and then the specimen should be removed into fresh spirit, strong enough to light with a match, and so packed. The receptacle should be quite full.

In preparing the skin the following course should be adopted: the skull and the bones of the legs are to be left in the skins. The animal being placed on its back, make incision from the *sternum* (breast-bone) to the root of the tail, next separate the skin from the carcase, so far as can be conveniently reached, and sever the limbs from the body at the shoulders and thighs. Each limb can then be drawn out—as a glove might be turned inside out—but the bone must not be separated at its junction with the toe, or the skin of the foot or leg be in any way injured. Now remove the muscles from the bone. This can best be done by cutting the tendons near the toes, and carefully drawing the whole mass away at one operation. It must come in one piece, not piecemeal. The bone will now be

clean. Clean the skin of the limb, and at the same time the other parts of the skin of all superfluous flesh and fatty matter. Dress the inside with arsenical soap, and apply freely powdered alum all over it, but particularly to the fleshy parts, as the eyes, nose, lips, feet, etc. Then replace the bones in the limbs, having previously, if possible, bound them with tow, or similar material, so as to replace the muscle that has been removed. Place a portion of stuffing in the skin of the head and trunk, and suspend the specimen



to dry. The animal figured in the illustration is an Otter.

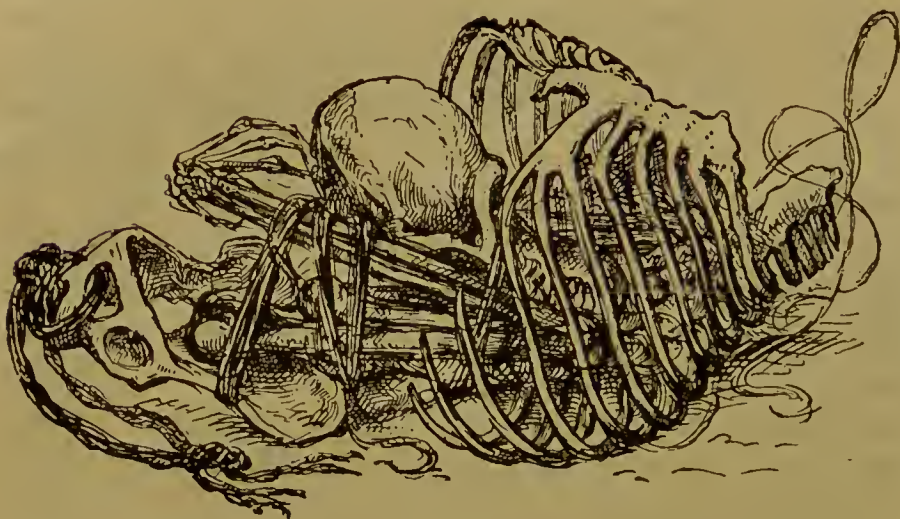
The tail can be treated in two ways. With an Otter, for instance, it should be cut underneath to the tip, and the bone removed; but with the Fox, and most other small mammals, it should be treated thus: sever the *vertebræ* from the trunk close up to the body, leaving the tail in its sheath. Turn back the skin until enough of the tail protrudes to fasten securely with a string, that can be attached to a hook, or tree, or other firm

holding. Then with a cleft stick, or the handle of your pliers, pull the skin sheath down toward the tip, and the *vertebræ* will come away whole, wrinkling the skin to the end. Shake powdered alum into the cavity, or, if preferred, insert Taxidermine paste on a stick.

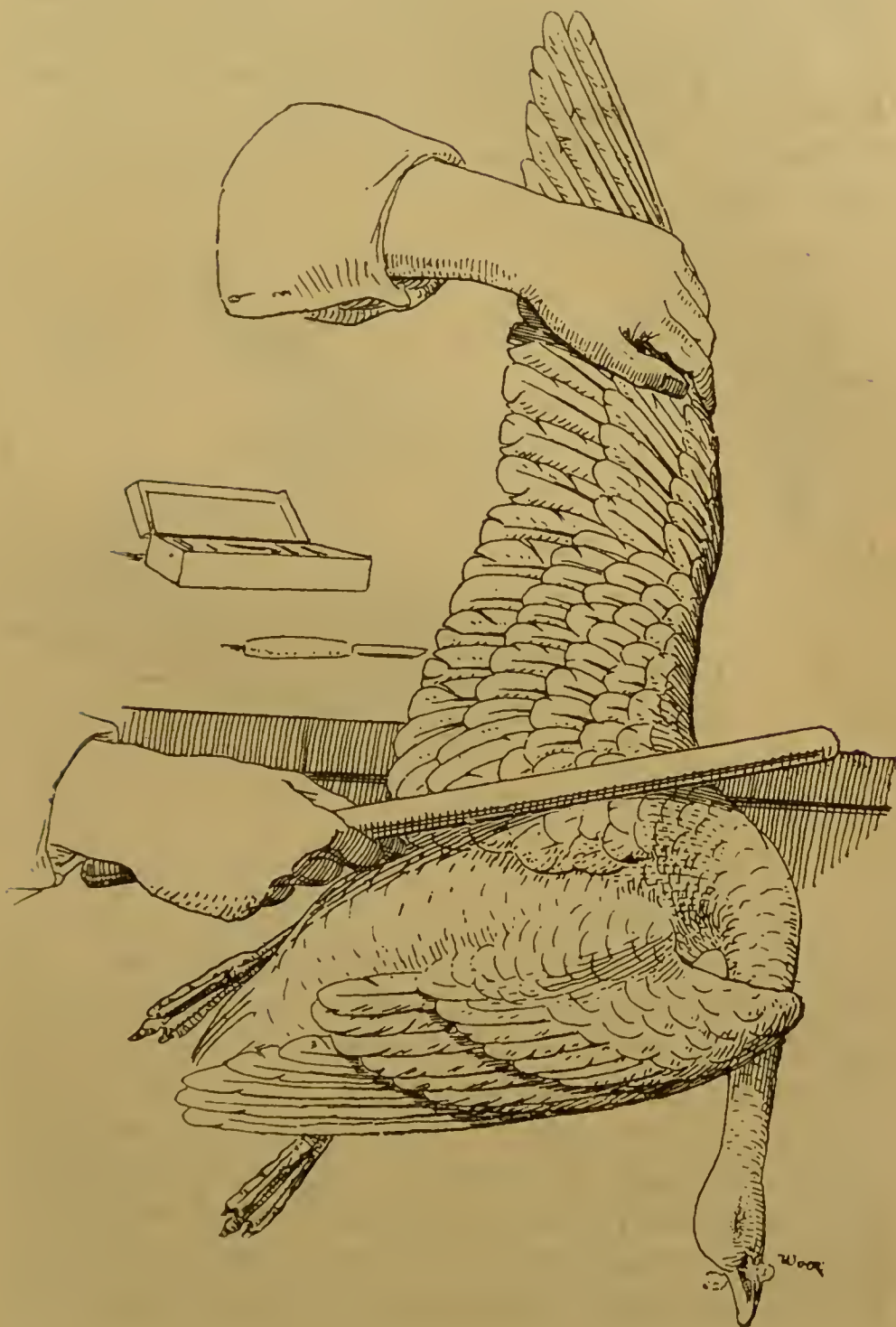
SKELETONS.—When it is desired to save the skeleton of an animal, the procedure should be this: Having removed the skin, cut the fleshy parts away; this need not be done too closely, neither is it necessary nor desirable in the operation to separate the joints. The bony frame, or its portions, should next be placed where they can be covered by water, the object being first to extract all blood, therefore it is well, as occasion requires, to pour off and renew the water, until it comes away comparatively clear. The next operation is to leave the skeleton in the liquid till the soft portions putrefy, and so leave the bone clean. The large bones that contain marrow must be perforated at either end, where the holes will be least observed, and returned to the water. They will come clean in due course like the others. The complete operation of this putrefying will occupy several months, but is expedited by a warm temperature. When the decay of the fleshy matter is complete, the bones must be cleaned by hand, and should then be immersed for a few (say 6) hours in a weak solution of lime-water. The bones are by this time quite separated, and it is all-important to care that not one, even the smallest, be missing; the loss of one little portion vitiates the usefulness of all—a skeleton incomplete in any part is of no value. The bones must next be bleached by the simple action of the atmosphere in

the shade. If the operator be abroad the bones may then be packed for transmission; if he be where skilled assistance can be obtained, they are fit for articulation. The illustration shows the skeleton of an Orang arranged for packing.

BIRDS.—Having seen that the cotton plugging of the throat, nostrils, and the shot-holes is safe, the first operation is to break the wing-bones (*humeri*) close to the body. If the bird be a large specimen, the most convenient and effectual way to do this is to hold the



bird pendent by his wing against the edge of a table or board, so that the bone may be fractured by the sharp blow of a stick, with as little rough treatment as may be. But the doing this skilfully is indeed the gist of the whole work; there is a proper way of doing it. The wing must be held by the upper feathers, pressed flat by all the fingers against the palm, so that the manipulation do not crush, or even seriously disturb the lay of the fibre. The blow with the stick

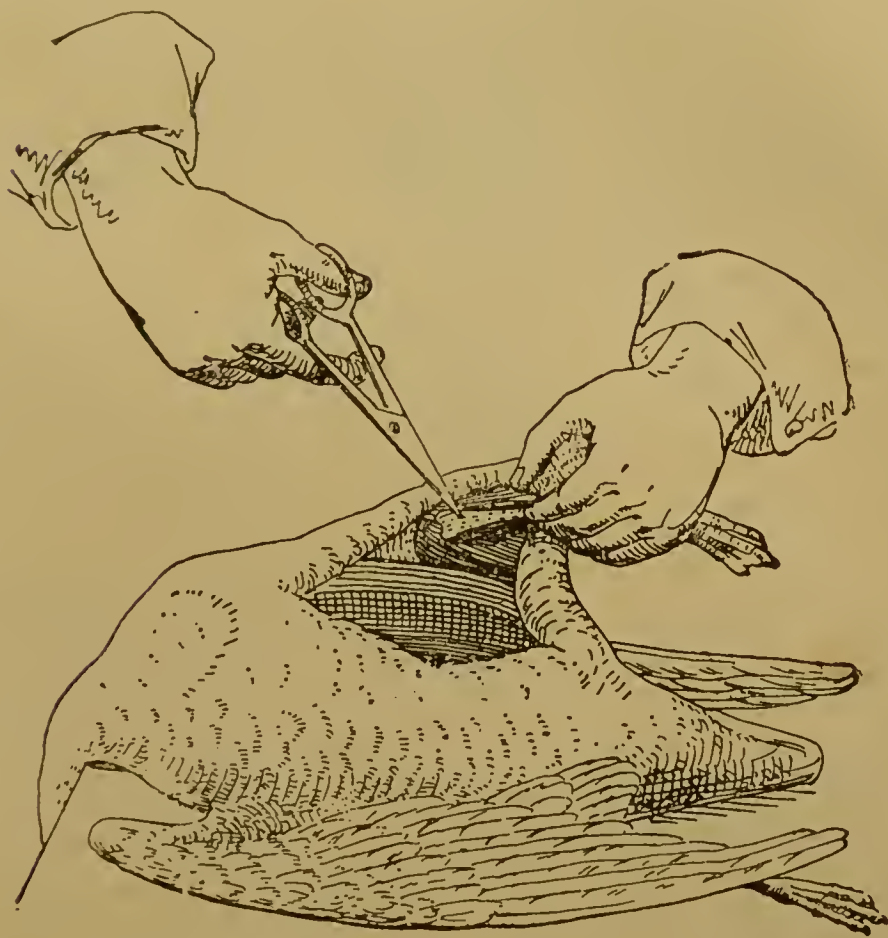


must be a firm quick stroke of sufficient strength to complete the fracture, not simply to bruise the flesh, or so rough as in breaking the bone to unduly mangle it. The firmness of the board or table-edge is a great element in the neatness of this operation. The action of the hand will best be seen on the accompanying illustration.



This is the method for treating large birds. In the case of small specimens—that is anything less in size than a blackbird—the same bone may be well broken by the thumb and finger, or at most by the forceps. The wing-bone being thus broken, place the bird on his back, the head toward you, in order that your knife may, what is technically called, “go with the grain of the feather.” By this I mean that the point of the knife should be deftly inserted under the

skin, just at the end of the breast-bone; raise the skin till it bags, then press the knife forward in one clean continuous incision down to the vent, so that the skin be separately severed, but the flesh remain uninjured.



Amateurs are constantly inclined to make their first incision from too high or too low a point; and the mistake of injuring the stomach in any part is another danger that besets them. The opening thus made in the skin should be no larger than is necessary for the

withdrawal of the body. For this purpose only is it made. Indeed with birds that have breasts of specially beautiful plumage and short feathers, as well as with divers, and aquatic birds, it is often desirable to make the incision under the wing. The great object is to get the body out of the skin in the cleanliest fashion, and so that none of the internal grease or juices soil the plumage. The overwhelming advantage then of a neat operation, so that the body remain practically unbroken, will be apparent at once. Sometimes it may be desirable to take the body out through the back, when the incision is made in the same manner as it would be on the breast. In fact the features to be especially preserved will rule the operator's choice in this respect. I, however, now suppose that the cut is made from the breast-bone as seen in the illustration.

Now put down the knife, and use the hands only, for the fingers are the best instruments. Insert the fingers under the skin on one side, and clear the skin from the flesh in all accessible parts. That done, insert below the skin a sufficient quantity of dry plaster of Paris, or such other similar material as, wanting plaster of Paris, you may be compelled to use to absorb such blood or other moisture as may at the moment be present. Treat the corresponding side in like manner. Next proceed to force out the leg. In order to do this, hold the leg firmly above the joint, and force the thigh through the aperture, at the same time carefully drawing off the skin; insert the point of the scissors below the flesh next the bone, and move them skilfully up between the bone and muscle, until, by raising the right hand a little, the scissors can

be made to nip the bone transversely just against the joint; cut the bone through and you can then thrust



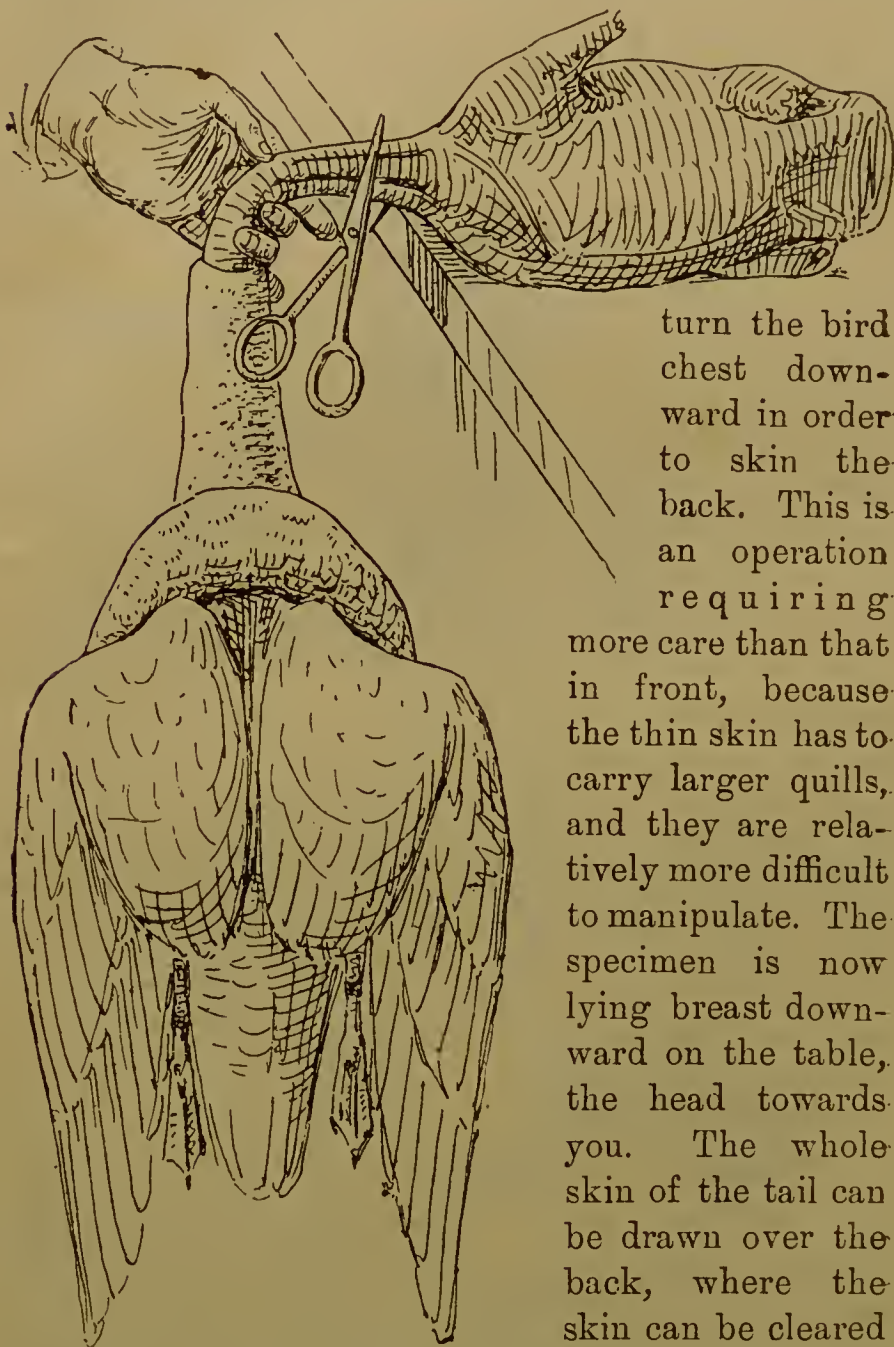
it out naked from the flesh, and with the scissors cut the tendons next the *tarsus*, and the whole muscle of the thigh will come away in one piece, leaving the

bone clean. This bone must be cut near the femur joint, leaving the head of the bone which is useless with the flesh attached to the thigh and body.



The bone, when thus freed, should appear as above. Having treated both legs thus, skin up to the root of the tail, but in severing the *vertebræ* leave the whole triangular projection in which the feathers are imbedded

for after treatment. It is a common error to cut this portion too low down, and much trouble results. Now



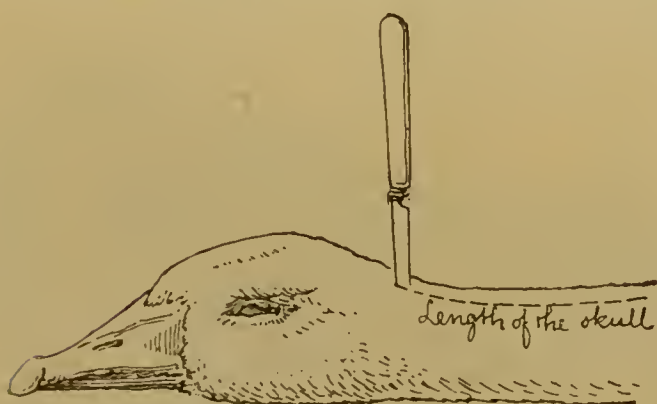
turn the bird chest downward in order to skin the back. This is an operation requiring

more care than that in front, because the thin skin has to carry larger quills, and they are relatively more difficult to manipulate. The specimen is now lying breast downward on the table, the head towards you. The whole skin of the tail can be drawn over the back, where the skin can be cleared

by the blunt side of the scalpel, and the body will thus be freed down to the wings. Here free the body by cutting the flesh through with the scissors at

the point of fracture of the *humerus*, and thereupon free the whole body from the skin until only the neck remains to be severed, as shown in the illustration.

The next step is one requiring judgment and dexterity. The head must be got away. With ducks, geese, and similar birds, the head is too large to come through the neck skin, and, in such cases, an opening must be neatly made from the back of the head, about two inches down the neck, of sufficient size to admit of the skull being removed for cleaning. Through this orifice force the skull, skinning it carefully until past the eyes, and in doing this pay particular attention not to work any injury to the edges of the eyes,

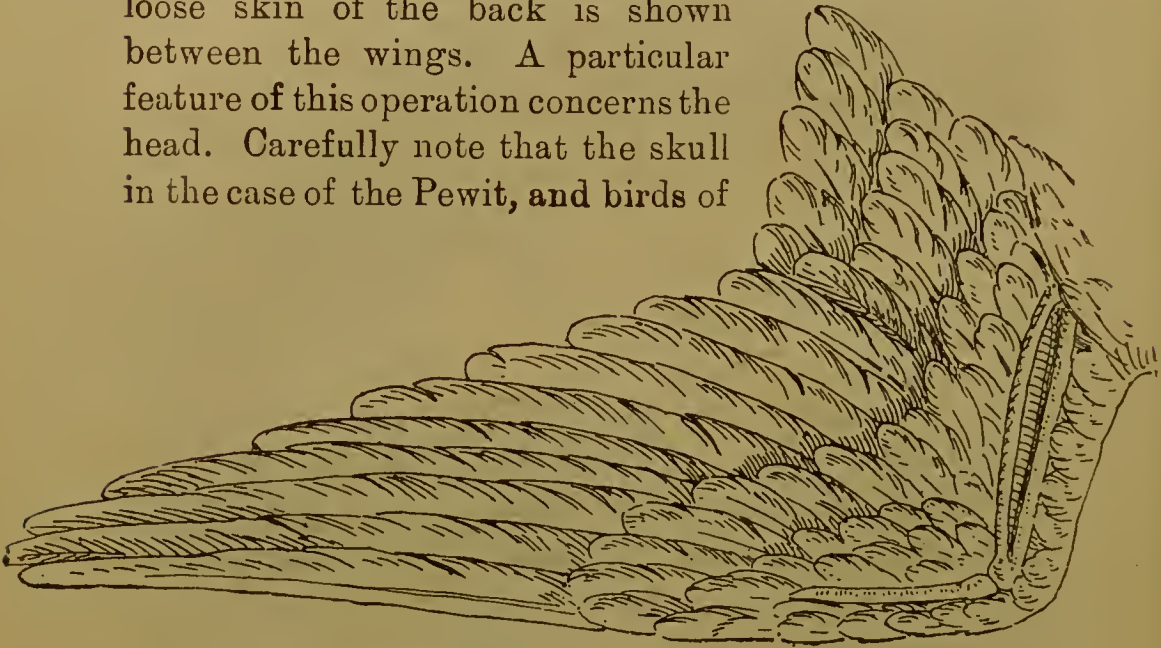


or to the ears; these last should not be rudely touched by the knife. Cut away the back part of the skull, with neck, tongue, and palate. Re-

move the brains and the eyes. The whole skin is then in a condition to be cleaned and prepared. The first thing to do now is to take away all fat and flesh, and make your skin as cleanly as you can; then dress the inside with Taxidermine. Bind some tow round the leg-bones where the muscle was, and restore them to their proper position. Put some cotton wool in place of the eyes, and, having forced some of the Taxidermine into the skull, return it to its place. In the case of the large birds—the specimen figured in our illustration is a goose—the wing must be treated thus: Open the skin from the outside along the bones as shown below, removing the muscle, without disturbing

the hold of the feathers on the bone; the quills here join the bone. It is important to bear this in mind, for if a serious error be made here the wing will be shapeless. Small birds can be treated from the inside.

The operations necessary to preparing a Pewit are figured on the block, p. 63. This is the specimen with skin reversed, showing how the flesh can properly be removed from the inside without undue disturbance of the wing feathers from the bone. The flesh is here entirely removed. The stitching necessary to take up the loose skin of the back is shown between the wings. A particular feature of this operation concerns the head. Carefully note that the skull in the case of the Pewit, and birds of



similar anatomical formation, is sufficiently small to pass through the skin of the neck entire without injuring it. The skull of some birds will not allow of this operation, but a nice discrimination will guide the operator to success in the delicate experiment. Fig. 2 shows the method of removing the eye, a "gouging" operation in which the instrument Fig. 5 is employed. Fig. 3 demonstrates how the skull should be cut for removal of the brain; the scissors are employed. Fig. 4 illustrates the removal of the brain with the instrument (Fig. 5) after the skull has been properly severed.

In the case of a Grebe, the feathering of the breast—its principal ornament—is so exceptionally delicate and necessary to be preserved, that particular care is required for the treatment of it. It is better



not to touch it with the knife, but the incision of the skin should be made laterally out of sight, under the wing. The illustration given, p. 64, shows, *a b*, where the cut should be begun and ended. The central figure

presents the skin reversed as taken from the body, *d*; the leg bones, *c c*, and the wing bones protrude.

It is not desirable to use powdered alum to bird-skins, as it tends to make them brittle. The specimen should be filled out by stuffing to the natural size, and a band of paper placed round it in order to keep the



wings and other parts in proper position till dry. During the whole operation, wood-dust, or other dry powder should be freely employed to absorb blood and grease, so that the plumage may be kept clean.

When the skin of a specimen has been taken off in manner set forth above, there is a proceeding which it is important to observe, that is called technically

“making the skin.” This is in reality a part of the operation of skinning, indeed that part of it which consists in finishing the work in a workmanlike manner. While the skin is fresh and supple it must be so disposed that as it dries it may take proper form rather than distortion, and much after-trouble will be saved. The skin, as it is inside out, must be cleaned—this is indispensable—and the Taxidermine No. 1 properly applied. Directly that is done, it is well to sprinkle the surface with some dry powder—say plaster of Paris, so that in handling the adhesiveness of the paste may not be inconvenient. It will be noticed that the skin between the wings, when raised from the bony structure, exhibits among the quills certain bare places. Now these would be most unsightly if they appeared prominent on the finished specimen. The tendency of the hollow skin, at this part especially, is to be too large, and it is better for after-operations that the skin should rather be contracted than expanded to anything approaching looseness. In setting up the bird, it is far easier to stretch the skin, if required, than to contract it; and now is the time to catch up and stow away any seemingly superfluous folds. These are most conspicuous on the back. To get rid of them, tie the wing-bones inside with a thread that shall lie across the back, and draw the wings together as near as in judgment they may best represent the position in life. This will enable the feathers to cover in the naked skin, that would otherwise appear, and will give solidity, so to speak, to the plumage at this part. This is little present trouble, but is the saving of infinite trouble in the future, and is of great consequence for the beauty of the bird. Having done this, turn the plumage out, but be careful in doing so

not to fracture the skin of the neck. Use the scissor-forceps to fill in the neck with cut tow; fill in the body; smooth the feathers into proper position, and your whole bird into proper shape. Place a paper band round the wings, that they may set in good position. Small birds can conveniently be slipped into a cone of paper.

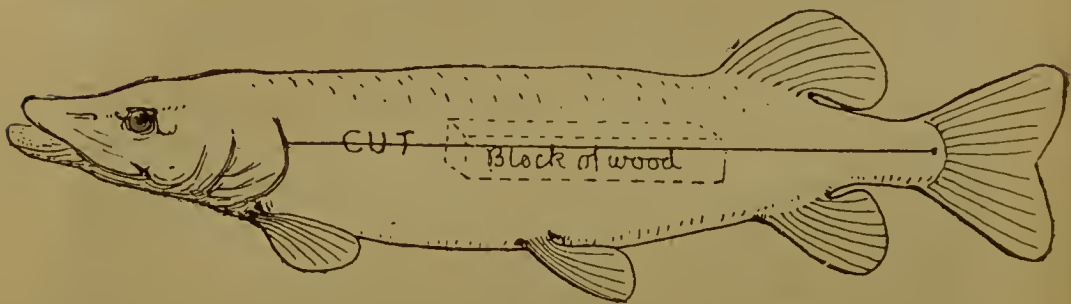
It may sometimes fall to the lot of the traveller to secure an Albatross, and at the same time he may not always know what to do best with his unwieldy and not very rare specimen. If he does not care to preserve it whole, he may well be reminded that there are some parts of it which may be profitably saved. The long tubular wing-bones are prized for pipe-stems, to which they can be adapted well; the great web-feet will make beautiful tobacco pouches when properly prepared, or a curious small work-bag for a lady can be formed of the same trophies. The wing-bones must be carefully cleaned: a good way is to open the orifice at each end, and boil them; or they can be macerated in water. The foot should be treated thus: sever the bone above the knee; cut the skin down the back of the shank and heel; insert the thumb and finger—you must not use any sharp instrument—so as to separate the web on both sides from the bony structure of the toes; do this down to the outer talons, and so that the toes can be drawn out of the web-pouch now formed; sever the talons from the bones on the inside with the scissors, leaving the talons attached outside; clean the skin neatly, and dress it well with Taxidermine; fill the pouch with wool, or tow, or sawdust, to keep it in shape. Of course the utilisation of parts of birds and animals in this way is mainly a question of inventiveness and

ingenuity, for many natural features may be adapted to the most useful and ornamental purposes, while at the same time they retain the character of trophies. The leg-bones of the Flamingo are long and have an elegant curve—they will form admirable pipe-stems; the teeth of animals can be adapted ornamentally in many ways; the talons of a tiger, or the hoof of an antelope, or the tusk of a boar, may, as well as antlers and more pretentious features, be employed for adornment or use; and there is just this advantage, that they may in some circumstances be saved, when the whole trophy has to be abandoned.

Birds can be kept in spirit, and this mode is particularly useful for the preservation of young birds in the down, very small specimens, etc.

REPTILES AND FISH.—As a general rule large specimens are skinned and preserved in similar manner to birds, although with reptiles alum may be used, especially on the thicker portions of the skin; but small specimens are kept in spirit. It must rest with the traveller himself to determine which course is best for saving the particular example he has secured. When a fish is skinned whole, he must be laid out carefully on a board, and the incision must be made not down the belly but along the centre of the least important side, from gill to tail. The object is to remove the body from the skin, with the least possible disturbance of the scales, etc. The skin can be manipulated neatly from each side of the incision. When, in this operation, you come to the base of fins, cut the obstruction inside the skin with the scissors, but with judgment, so as not to sever them too closely, that they may not be unsettled. Cut in like manner the *vertebræ* next the base of the head, and next the extremity of the

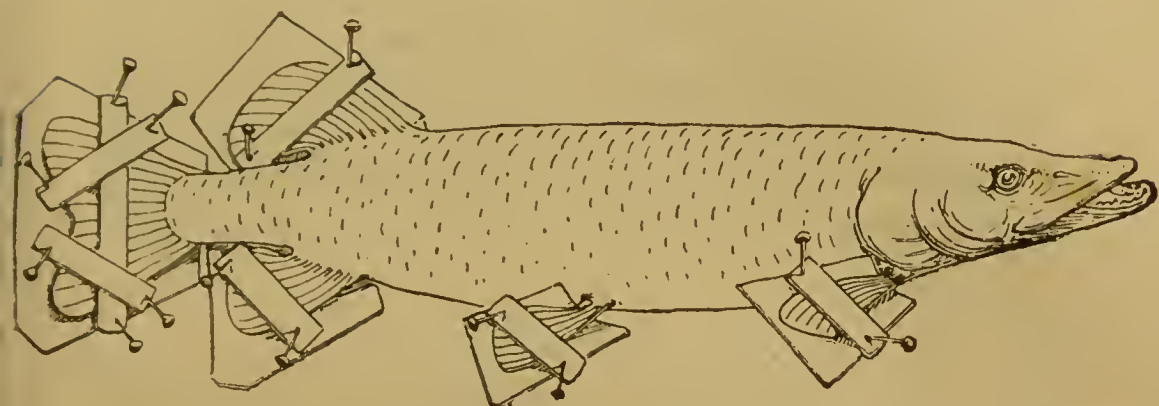
tail; then, if need be, cut them also in the middle so that the flesh may be taken away in two pieces; but this is a matter of convenience, and must be made to subserve the all-important point of not disturbing, bending, or otherwise injuring the skin, for the scales that constitute the characteristic beauty to be preserved are very fragile and easily detached, and to break or detach them is fatal to the value of the specimen. Clean the head as well as you can, and then paint the whole interior surface of the skin with Taxidermine and apply the same preservative to the



head, into the cavities of which cotton wool may be pushed. The body should be filled with dry sawdust up to its natural shape; next draw the edges of the orifice together with neat stitches. The fins and tail must then be treated. These, while wet and pliant, must be set out in natural form on pieces of card, so that they may dry as they are intended to be displayed. The specimen can now be put on one side to dry.

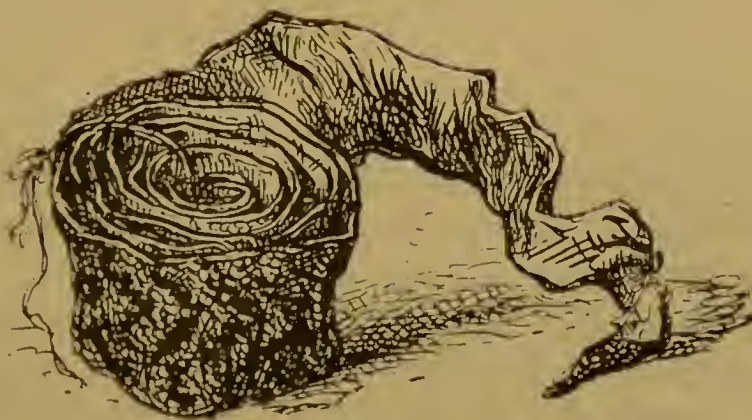
This process, however, rather presupposes the opportunity for quiet treatment at home. When the naturalist is on the field, shorter means may be used. The skin being removed and dressed with Taxider-

mine, may be left to dry in convenient form. The skins can then be packed together, and it will be found useful to pack with them some light stiff material like thin wood, dried rushes, etc., that dis-



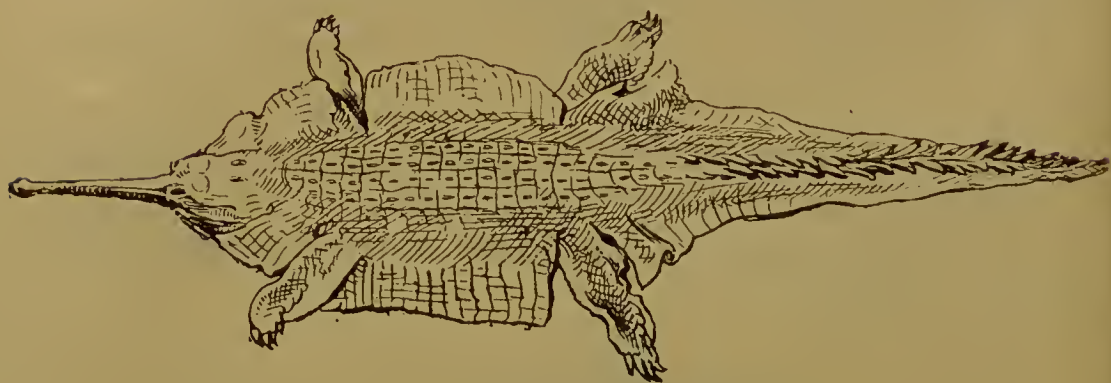
posed longitudinally will prevent the possibility of the brittle skins being bent accidentally.

In skinning large snakes, the body being removed,



the skin, properly treated with preservative, can be conveniently folded like a ribbon round the head, until it forms a small portable bale of similar form to that figured in the illustration.

The smaller fish and reptiles, when preserved in spirit, should be saved in form as uninjured as possible. Carefully preserve the natural appearance of the creature so far as may be; and it is very important that on a label (of tinfoil or paper) attached to the specimen itself, or to the receptacle wherein it is placed, should be noted a sufficient description of it made at the moment it is fresh before you, especially of colours and appearances and features which may disappear or be altered by the spirit, unless the species

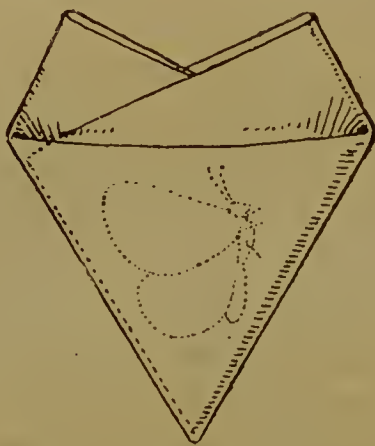


be quite well known and these details are manifestly unnecessary. Be particular as to the locality in which the specimen has been captured.

INSECTS.—The ingenuity displayed by the collector in capturing and storing insects is often a personal quality, and the methods that may be adopted are almost infinite. The general methods most approved are all that can be referred to here. Butterflies, moths, and some other species, whose beauty is in their colouring and is very fragile to the touch, must be treated for storage and preservation in a different

way from beetles and insects of similar class. In fact, all excepting the first named may be preserved in spirit so soon as captured for after treatment, and they need not be injured by the process. For permanent display in the cabinet, all insects must be properly set out—the *Lepidoptera* with distended wings, and the *Coleopterous* insects in suitable position. They should be killed the instant they are captured, to prevent injury resulting from efforts to escape. A gauze net is generally used. When a butterfly is got into it, the collector watches his opportunity while the insect is still in the gauze, and so soon as it closes its wings he lightly and sufficiently pinches its thorax between his thumb and finger. The butterfly falls from the net dead and uninjured. The specimen must not be handled excepting to pick him up by the legs, holding which the wings may be slightly blown apart and a proper pin pushed through the body, so that the specimen with closed wings may at once be stored in the collecting box, or if the creature be not quite dead the pin can be inserted on the under part of the cork in the cyanide bottle, and the specimen kept there till dead. Butterflies should be stored thus with folded wings, until they are required to be set out for the cabinet. When the collector reaches home, he can store the contents of his pocket box, by putting each specimen in a small triangular envelope of paper, outside which a note may be made. Hundreds can be stored in small space. Moths, on account of their greater rotundity, must not be treated in exactly the same manner by pinching. They are not frequently captured in the gauze, and are best killed in the cyanide bottle, or by the application of a little prussic acid. They are conveniently

taken home in separate pill-boxes. Beetles, etc., may as a rule be well preserved in spirit, which kills them forthwith; or they can be killed in the cyanide bottle. When the time arrives for arranging insects for the cabinet, the Butterflies can be relaxed by placing them for a time on wetted sand, or exposing them to steam. The wings, legs, etc., can then easily be set out by the aid of small pieces of card on pins (see p. 73, figs. E, F). Beetles, etc., should be set out while they are wet when taken from the spirit (see p. 36 as to preservatives).

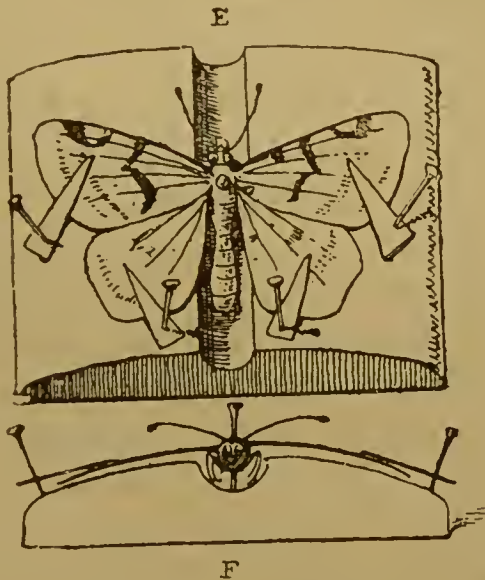


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In England, and on the Continent of Europe, many entomologists now study the exotic species, which they can obtain from friends or correspondents residing abroad, either in the *ovum* or egg state, or in the chrysalis or pupa state. Most people know that from the eggs (*ova*) of Butterflies and Moths come out caterpillars or *larvæ*. These *larvæ* moult several times, and after each moult, in some species, there is a remarkable change in the colour of the *larva*. The *larvæ* of many species of *Lepidoptera* go into the ground to change into the *pupa* state, and sometimes they form a shell in the ground; some turn into *pupæ*

in leaves, others on the ground in a sort of web. The *pupæ* of Butterflies are most often found on grasses, twigs of shrubs, or on trees; others on walls or fences.

The *pupæ* of many species of *Bombyces* are inclosed in cocoons most often found on trunks, and especially on branches of trees. Some of these cocoons are remarkable by their size and the beauty of their silk. When the leaves of the trees have fallen, these cocoons are easily seen hanging from the branches.



In some species of *Lepidoptera*, the *imagines* (perfect insects), male and female, are very much alike, but the body of the ♂ is larger than that of the ♀. The Moths of the male *Bombyces* have *antennæ* (horns) very much more pectinated than those of the female; the body of the latter also is generally much larger. Persons wishing to rear the *larvæ* should keep the Moths in cages, in order that the eggs may be secured.

With respect to the rearing of the *larvæ* of large *Bombyces*, the following plan may be adopted, till the second or third stage. Use large bell-glasses, with a

few holes in the dome, or glasses open at the top, which in this case must be covered with gauze. Place these glasses on saucers full of sand covered with a piece of paper. Through the paper stick into the sand some branches of the food plants proper to each species. Place the young *larvæ* on these. Under bell-glasses, which, of course, must be placed in the shade, no water is required to keep the little branches fresh, and the young *larvæ*, which are apt to wander till the first or second moult, cannot escape. When the *larvæ* are large, it is best to rear them on large branches plunged in water, and without the glass covering. This refers to the rearing of the large silk-producing *Bombyces*, and of all those forming some sort of cocoon. When the *larvæ* have to bury themselves to change into *pupæ*, it is of course necessary to rear them in a box, containing a few inches of mould. This method should always be adopted when the habit of the *larvæ* is not known. Breeding cages, which, as a rule, should always be large, must have their sides of perforated zinc to give air. Cages ought to open by the middle, like two boxes open on one side, and placed one over the other, and fastened by hinges.

When *pupæ* have to be sent to England from very distant countries, especially if they have to cross the tropics, they can be conveniently transmitted in small strong boxes by sample post; each box not to exceed eight ounces, and to be registered, but place the stamp where the stamping will do no harm. The *pupæ* should be sent as soon as they are formed; and if underground *pupæ* they should be placed in soft damp moss. The boxes should also have a few holes in the sides to admit air.

If boxes containing *pupæ* or *ova* of *Lepidoptera*

could be placed in the ice-house on board ship, which would retard considerably the emergence of the Butterflies or Moths and the hatching of the eggs, valuable species could be sent from very distant countries. Salmon *ova* were thus safely forwarded from England to Australia and Tasmania.

ARTISTIC SETTING-UP OF TROPHIES.

IN order to reproduce the life-like form of any animal by the employment of its preserved natural features, not only technical skill, but knowledge and artistic feeling are necessary to the production of a worthy work. Formerly, the process aptly termed "stuffing" was employed. The results were seldom or never of more than a relative value, especially in regard to the mammalia. The fact was too often ignored that the use of astringents, necessary to preserve a skin, invariably distort it, that this distortion differs even in several parts of the same skin, by reason of the varying thickness or even the condition of health in which the animal was killed; for instance, the skin of a fat animal is liable to undue expansion, that of a poor beast, to peculiar contraction; and mere stuffing can give only an untrue representation of the living creature. It is therefore incumbent upon the operator, firstly, to make himself thoroughly acquainted with the habits of the animal in a state of nature; and next to choose some incident of the creature's living existence which he desires his specimen to illustrate. This will enable him to arrive at his design. He must then make himself acquainted not only with the bony but the muscular structure of the animal, by which



SHOT BY H.H. THE MAHARAJAH OF COOCH BEHAR.
(Length before skinning, 10 ft. 1½ in.; dried, 11 ft. 7 in.)

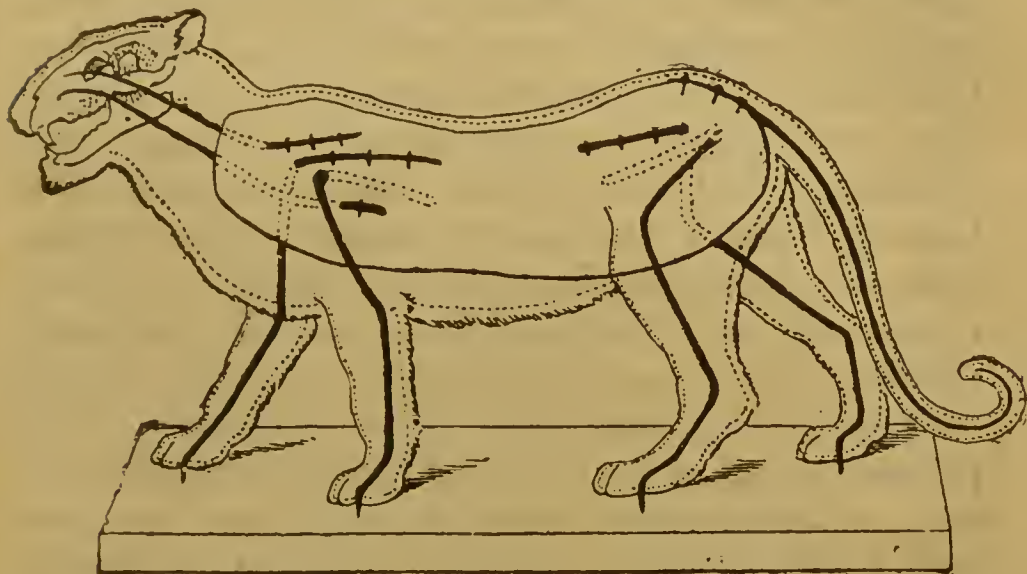
knowledge he can, if he have the proper technical and artistic skill, produce a *model*, whereon he can properly place the skin and other natural features of the specimen, so as to make as perfect a representation as practicable of the living animal, in form and detail, and of the creature's living habits in his design. This is the only course whereby noble trophies can be made to have more value than a paper description of them would possess. On the individual skill, knowledge, and taste of the artist depends the real value of the work,—in the same way as that of the sculptor, or painter, is in degree to be estimated.

A typical animal to illustrate the propositions laid down above is the Tiger, because of his various and picturesque habits, his magnificent proportions, and great beauty. I shall, therefore, describe the setting-up of a specimen of this feline in detail. But here a qualifying observation must be made. No book description can adequately convey all that should be known. To learn what is necessary the personal instruction of a good teacher, and the smallest modicum of experience, is worth more than any printed course of instruction, however ostensibly complete. We will, then, suppose that a perfect skin, in good condition, has been procured. Let us select the simplest action of the creature, viz. his stealthy walk through a grassy jungle, which is his habitat, when his peculiar expression is that of constant caution, whether he be in retreat, or advancing, with the snarl of ready offence which is habitual with him. This is the design. As digitigrade quadrupeds, the cats walk on their toes, and the claws then being retractile are concealed. The left hind leg and the right fore leg, or *vice versâ*, are used together in progression. There is a difference in

the pose of the ear to express alertness, caution, or anger. In the first case the ear is erected; the ear is partially depressed when the beast is only cautious, but in anger, or incipient anger and alarm, the ear is levelled with the skin of the head. We will choose the semi-depression. The mouth should be partially open, showing the teeth and tongue, but the lip not raised, the expression being that of slightly panting. In order to produce this design, first study the skin and form a judgment of its natural dimensions, as to height, bulk, etc. A distinct preparation of the skin is necessary as a preliminary to this. It must be what is technically called "shaved" or "fleshed." This process consists in first softening the raw skin—which is most often native-dressed with lime—by sponging the flesh plentifully with liquor. The skin is then placed on a rounded beam conveniently, and what is termed the "pelt"—the *enderma*, in fact—is removed, by scraping and shaving, with a currier's knife, the edge of which is turned peculiarly for the purpose. This, in reducing the substance of the skin, renders it elastic and better adapted for use on the model, which must be now constructed. The head, with the lips, eyes, and burrs of the ears, as well as the feet, must be carefully shaved with an ordinary knife, skilfully manipulated. Now fold over the skin with the hair outwards, so that the limbs accord with the intended position; measure the points and make the best estimate possible under the conditions as to bulk, etc. The limbs should be folded and the whole arranged as nearly as may be to give the outline of the animal.

In making the model first deal with the trunk. Two 1½-inch boards, 11 inches wide, of proper length, should be glued, and what carpenters term "dowalled"

together by the edges. Place the skin as folded to represent the animal flat on this board, and from it draw thereon the outline of the trunk. Cut the board to this outline—to the inside of it, so that room be allowed for the modelling of the muscles on this framework. Get four sufficient iron rods— $\frac{5}{8}$ -inch is the medium gauge—for the legs, one for the tail, and two to support the head. Bore a hole through the board where the *scapula* or blade-bone would come. Through this pass the rod till about 15 inches are on



the other side, then bend this portion sharp round at right angles, to be fastened by staples firmly along the board in the direction of the hind quarter. At about 3 inches from the board bend the rod again, and incline it forward at such an angle as represents the natural position of the *scapula*; then bend the rod back again for the *humerus*, and once more forward for the *ulna* and *radius*, then shortly for the carpal and metacarpal bones. This is the extent of the rod, which must now be taken through a wooden stand and fastened under it. It will be seen that this

iron, which must be repeated exactly on the other side, is intended to take the place of the absent bones, and that it must stand away from the board just such distance as the original bones would have occupied. The hind legs should be treated in similar manner (see diagram). The iron for the tail must be appropriately bent, and attached to the board in position; as also the two irons to support the skull, which must now be attached.

The next operation is to carve in soft wood the bones and muscles of the limbs, keeping them small enough to be finally covered with clay. I use a particular substance of my own invention for this modelling, and it dries as hard as marble without any shrinkage; it is never brittle. The first group, "The Combat," that I was able to produce by this means, was exhibited in the International Exhibition (1871), in Division III. (*Scientific Inventions and New Discoveries*.) The wood, representing bones, should be made in pieces, much as a lay figure is made. The pieces then being sawn through the centre longitudinally, a hollow space should be cut down in them, not only to lighten them, but that they may be riveted together over the iron, so that the rod occupies the place, as it were, of marrow in the bone.

The trunk must be built up so as to be light and hollow, but with an appropriate surface to receive the clay. Behind the shoulder, midway, and next the thigh, should be fixed, on either side of the central board, segments of 1-inch board, of proportion sufficient to give the required bulk, and to secure the contour of the ribs, etc. A nearly circular board must be shaped to distend the neck. Across the edges of these boards coarse, strong canvas must be

neatly tacked, small laths being inserted at proper places to prevent the canvas sinking. The rod which is to support the tail must be covered with tow, neatly bound on to the required form, and then in like manner sewn up in the canvas. The same material must also be extended over the skull, whereon the fleshy excrescences must be represented cleverly by tow. We have thus a complete light framework covered with strong canvas, excepting the limbs. On all necessary places over the whole framework a surface of modelling clay is to be worked. The ribs and prominent muscles of the trunk, the muscular development of the shoulders and haunches, the joints and extremities, must all be carefully modelled on. Ordinary modelling clay is used; and when the model is finished, and nearly dry, paper should be pasted over the clay to prevent it from breaking away. A good method is to perfectly steep brown paper in a pailful of hot paste. The softened paper can be put in small pieces over the clay, and readily adheres.

The model is now completed and made ready to receive the natural features of the animal. First of all the eyes must be carefully adjusted in the most natural manner; the claws must be next inserted in position. It remains to place the skin. This must be again damped with liquor till quite soft, and in this state it must be carefully arranged on the model. First manipulate the head, paying particular attention to adjust the lips, eyelids, and ears properly, so that the required expression may be secured. It is advisable now to tack together the edges of the skin in certain places, as under the throat, the four joints under the armpits, and at the groin, midway under the belly, at intervals along the tail and the limbs. Adjust

the soft skin to the inequalities of the model, using a "piercer" and the thumb. The seams must be carefully and neatly sewed up. A delicate and important operation remains. The skin should fit perfectly all the indentations of the model. In order to attain this, the skin, when worked wet into the recess, should be secured there wherever necessary by drawing pins, which must not be withdrawn until the model is perfectly dry. Then, the pins being removed, the fur can be cleansed in the usual way, viz.: rub with the hands very fine mahogany dust all over the coat; then beat it with a fine cane and finish with a brush. The tongue, which is modelled in clay, and tinted, should now be placed in the mouth, where the tinting can be finished. At the same time, the lips, eyes, and nose can be tinted and finished. The pigment used should be the finest tube oil colour. It is best before painting to cover the mucous surfaces with hot wax, which promotes the naturalness of the appearance most materially. The whiskers which may have come from the skin should be carefully replaced.

Accept it as a golden rule never to cut the skin.

The method described above is given on the presupposition that the skin is one as ordinarily received from India, cured by native practitioners. But in cases where the skeleton of a beast is preserved, and is available, much of the work may be saved by utilising the bones, especially for the limbs; and in any case they furnish the true proportions of the animal, which are so difficult for the inexperienced operator to arrive at without them.

The mounting of Head Trophies is best achieved in the following manner: If the head has been received

in pickle, the skin should be thoroughly cleansed in fresh cold water, and should directly afterwards be shaved on the flesh side, as directed in the case of the tiger skin. Whether it be the head of a Tiger, a Stag, or a Bison, the process is the same. A proper



FROM THE COOCH BEHAR TROPHY. ROWLAND WARD, F.Z.S., *fecit*.

estimate must be taken of the length of neck. What is called a neck-board must be prepared accordingly; that is a framework to which the skull is to be attached, and whereon the skin of the neck can be distended properly. This board is a flat piece of inch

deal, 11 inches wide, cut to the shape of the neck, as the central board is shaped for the trunk of the tiger. The construction is on the same plan, the form being modelled in like manner. This neck-board is fixed to a heart-shaped back-board, by means of which it can be hung against a wall. The skull and horns having been firmly fixed on the artificial neck, the skin should be placed on the model and carefully adjusted. In well prepared trophies the seam should be up the nape of the neck, and the throat be intact. The nostrils, lips, and eyelids of the Stag, or Bison, should be moulded with artistic feeling and particular care, and clay should be injected between the mucous and outer skin of the lips, nostrils, and eyelids, so as to give them the rotund, fleshy appearance they have in life. It is better to insert the eye in its orbit before the skin is drawn on. The ears must be manipulated into shape while they are drying, and when the specimen is dry it can be cleaned in the usual manner.

Of small mammals the Squirrel will probably serve best as an example, and in this instance I shall presume that the skin has just been removed from the animal in a fresh condition, according to the method fully described on page 41. It is always an advantage to set up a skin while it is fresh. Prepare a body wire about 12 inches long, and of the thickness of ordinary whipcord; cover this with tow to the size of the carcase that has been removed, and bind the tow neatly with hemp; in fact, shaping the tow as nearly as possible to represent the form of the squirrel. For a sitting position, bend the wire so that the artificial body have the necessary arch of the back. The end of the wire next the tail must be turned and concealed

in the body. Certain stitches through with a long needle will assist materially in shaping the form and strengthening the frame. A wire covered with the requisite quantity of tow will form the tail. Four wires, each about 3 inches long, will be required for the limbs. Pass these wires severally through the fleshy pad of the extremities, and bind the bones to the wire with cotton, taking care to leave about 2 inches of wire beyond the *humerus* and *femur*, so that they may be passed into the frame of the body and clinched. Next fill out each limb by carefully binding tow in proper proportion round the bone. Never exceed the natural size. The bones having been returned to the skin and the limbs completed, the upper end of the body wire should be cut so as to protrude only 1 inch and then should be inserted in the skull, the whole skin meanwhile being turned over the skull. A stitch driven through from eye to eye will fasten the head securely to the artificial neck. Small portions of tow must be inserted where the flesh has been taken from the skull, which can then be returned and the skin drawn into its position. The limb wires can now be inserted in the body and clinched. The skin having been properly drawn over, the parts can be neatly sewed up, the limbs bent to their natural position, and the wires of the feet passed through a stand so as to be secure. It will be found advisable to manipulate the skin with the "piercer" and thumb, in order neatly to adjust it, and finish the specimen to taste. The eyes should next be inserted by adhesive glue paste. The fur should not be cleaned till the skin is quite dry.

Reptiles may be treated in precisely the same manner.

Birds, when the skin has been properly removed and dressed, as directed on pages 54-67, should be set up in manner following. For example, a Pheasant, say freshly skinned, should have a similar body wire to that employed for the Squirrel, but proportionately stouter to sustain the extra weight. The leg wires should be half as stout again as the body wire, and should be inserted at the back of the *tarsus* where the tendon runs. The fleshy part of the thigh must be



made up in the same manner as directed in the case of the Squirrel, while the body and neck is to be formed on the body wire (see fig. A) in precisely the same way. In the illustration, fig. A is the body wire; fig. B is the same dressed neatly with tow bound with thread to the size of the bird's body; similar wire must be appropriately dressed for a long-necked bird. With most birds the neck is almost hidden by the feathers; but some species have necks (like the Heron) requiring

special treatment. With the last named the substance is formed on the wire. With the first mentioned but little stuffing is needed, and that can be loosely inserted before the wire, which may be pushed through it. One end of this body wire is thrust up the neck and right through the skull, so that it appear right through the top; while the other end is made to protrude from the other extremity to support the tail. The leg wires must be inserted through the sole of the foot and under the skin up the back of the leg where the tendon was, until the pointed wire is worked between the thumb and finger to equal position with the thigh-bone; push this bone with the wire through, bind both with the requisite tow, and draw them back into the skin of the thigh, then continue working the wire on, until it has progressed enough to pierce right through the tow on the body wire. The leg wires must cross, and where they cross in the body they must be firmly twisted together with the pliers, so that the junction is covered by the tow. Much depends on the firmness of this fastening. Next insert such wool as may seem necessary to fill out the breast, and sew the skin neatly up. Dress the feathers smooth and bend your bird into shape, next wire him on to his perch, or other stand, and so you gain use of both hands. Place a short wire through the quills of the tail to spread the feathers. Set the wings into position with wires, and insert a pin wire into the back, another into the breast; then, by means of these, lightly baste the specimen with cotton so that the feathers may dry in proper position. The symmetry and natural pose of the specimen should be a matter of most careful study. No amount of technical skill,

or of imaginative power, will in the least compensate truly for the knowledge of nature. To have seen the bird healthy in his natural habitat, and to be able to reproduce his natural behaviour and appearance, is an inestimable advantage. We cannot all of us command that; but we can do the next best thing, rely on the information communicated by others who have. My late father, when travelling with Audubon, accumulated an inestimably valuable store of such information; for it was the invariable practice of that great naturalist directly a specimen was secured, and before any treatment of it, to have a sketch made of it, in the carefully observed natural position of life, with record of all colours and contiguous, or surrounding, natural features. Nothing is worse than to give a pretended character to a specimen, or to mount it with details that are anachronisms—such as to put ferns and grasses with birds who never existed where such ferns or grasses grew; or, to put seaweeds with creatures who do not frequent the ocean or sea-shore. The true sportsman-naturalist should esteem the record of an animal's pose or habits in life as important as any other record, so that when the specimen comes to skilled treatment, the naturalness of it may be a feature that enhances its value in every way. The line of form in many animals is not given by the skin, but by the fur, or feathers, as the case may be. He spoils a restored specimen who destroys this character by too much smoothing. By the eye and erection of the fur, the expression of anger is given. Some birds have the power of erecting their feathers, their crests, or position of their plumage, in token of passion, or for purposes of cleaning their plumes, as

when a Pelican emerges from the water; and all character is destroyed by the misapplication of neatness, by too much tying down of feathers, or purposeless stroking of the fur. A test of proper treatment is the setting-up of the neck. Too frequently the neck is quite distorted by the stuffing, and elongated out of all proportion in the finish. The carriage of the head in nature is of paramount expression. When a bird is dead the muscles of the neck become flaccid, and the neck seems to be longer. This tendency is often aggravated by unskilful treatment of the skin, and destructive disproportion may result. It is a fault to guard against, and an arrangement to be carefully achieved. For instance, a Duck, sitting on the water, shows but little length of neck; sometimes, when at rest, hardly any; but the same bird in flight shows a long neck. Some knowledge of drawing and of modelling, seems to me to be essential to artistic setting-up of animals; and the best of specimens, inartistically mounted, are relatively worthless.

All the wire used for these operations should be annealed iron wire.

A word of advice. Amateurs are apt, in seeking models, as to pose, action, etc., to choose thoughtlessly. I counsel them never to copy any ordinary "bird stuffer's" works, and to be very careful how they accept as authorities the pictorial representations in books. If they cannot go to nature direct, in these days of instantaneous photography and sensitive plates, they can obtain photographic pictures from nature.

The dried skins of foreign birds must be softened and thoroughly relaxed before being manipulated for

setting up. This is best effected by placing the specimen in a closed box, on wetted white sand, covered by paper, so that the evaporation may penetrate it. The duration of this process must be determined by the size of the bird; one night is sufficient for small skins. The necessary stretching of the shoulders and other folded parts must be effected carefully, so as to assimilate the specimen to a green skin.

The grouping and "fitting-up," as the ornamentation is technically called, of specimens is an important point, and one the careful attention to which greatly enhances their value even in a museum, where such work is not ordinarily employed. Such addition to the naturalness of the subject often affords opportunity of, by little things, illustrating the habits and habitat of the animals. To take a pheasant, for example: Having set up the specimen, if it is intended to cover it by a glass case, a few natural ferns, suitable to the habitat of the bird, should be dried, and the faded colour restored, where necessary, by tinting with oil pigment. Grasses should be treated in the same way. The surface of the structure on which the bird is mounted—or, in other words, the ground—should be formed of calico, tacked with taste over a wooden framework to assume the required forms. It should then be covered with small pieces of brown paper that have been well soaked and softened in a mixture of glue and whiting. A few loose stones and portions of sand will readily adhere to this surface, and give the required reality of appearance. But it is necessary that these should not be applied until the surface is sufficiently hardened to receive them without being injured. An old root, pieces of lichen, and similar features can be introduced according to taste, so that they be accurately employed. The whole production

must be painted with care, wherever painting may be necessary, so as to reproduce naturalness in the greatest perfection.

It is essential that the plumage of birds should be quite clean and as perfect as possible before the specimen is mounted. The best way of removing blood stains or other impurities from feathers is as follows: Dissolve a piece of pure pipeclay, about the size of a walnut, in a short pint of warm water, then with a portion of fine flannel steeped in this liquid, and soaped thoroughly with best yellow soap, saturate and rub the feather the right way; having done this sufficiently, immerse the feather, or the bird-skin, in clear cold water till it is cleansed, then roll it in a dry cloth, which, when duly pressed, will absorb the water. Having done this, hold the specimen within the heat of a fire, all the while beating it briskly and lightly with the folded end of a clean towel. In the case of detached feathers, they can be waved rapidly, or swung round at the end of a string, before the fire. Under this process plumage will resume its perfect order. This is by far the most effective as well as simplest operation of the kind, surpassing the employment of spirit and plaster of Paris, salts of sorrel, blue water, etc.

A method of treating fish trophies must be mentioned here as being frequently more convenient, in certain circumstances, than the skinning of them, and at the same time sufficiently efficacious for the purpose. This is to cast the specimen in plaster of Paris; and, whether we care to complete the cast with imitative colouring, or simply to preserve it in white, accuracy of form is at least obtained. A mould must be made. Most fish are more or less covered with a transparent slime, which, for purposes of casting, would obscure

the small indications of form, such as scales, etc. This coating must be got away. To effect this, lightly sponge the specimen with dilute vitriol, which will have the effect of changing the slime into an opaque film, which can be removed almost like a skin. The fish must then be carefully posed in position, on its side, and all those portions underneath the specimen where the plaster would penetrate should be filled in with clay; this, indeed, should form a bed for the fish, whose fins should be displayed on the surface by being impressed into it by means of the thumb. The plaster must be carefully prepared: put some water in a vessel and lightly shake the plaster, with the fingers, into it—not pour the water on to the plaster. The first batch should be very limpid, but little thicker than milk; it thickens rapidly as it stands. Pour this limpid plaster over the specimen—skilfully, so that each portion be well covered, and all the interstices filled with a first film of white. Directly this is set, put on a second coating of thicker plaster, and so on till the mould is thick enough; shape it at last roughly with the fingers. When dry, or rather quite hard, turn the mould over, pick out the clay, take out the fish, and the mould will be fit for use. This is what is called a “waste” mould, and the reason will be readily seen. The cast is produced by substituting plaster in place of the fish, thus: First dip the mould, if space admit of it, into clear cold water, so that the inner surface become thoroughly saturated; or, if the mould be too large to immerse it, wash the inside lightly over with sufficient clay-water, that is, water coloured with modelling clay; the object being by saturation to prevent all absorption on the inner surfaces. If the mould have been preserved till it is dry, an application of boiled oil will have the same

effect. The plaster to be inserted must be skilfully mixed, at first quite limpid, and this must be washed into the mould so as to fill all interstices, without any bladders or bubbles appearing as this first coating sets. A second coating strengthens the first, and so on; but there is no occasion to make the object solid, although the walls of the cast must be in all places of sufficient thickness. When the plaster is well set hard, the next process is to chip away the mould from the cast, and the mould is therefore called "waste." This requires skill in the application of sufficient, but not too much strength. It is a convenient resource to put a little tint into the plaster of the mould so that it may be clearly distinguishable from the cast when we come to chip it away. The cast when cleared should present all details of the specimen perfectly. When a number of copies of the cast is required it is necessary to make a "piece-mould"—a much more complex operation. It is a mould that is made on the object, in pieces that fit perfectly together and can be removed one by one from the cast, and replaced in position for each cast. It is necessary to make such a mould on a cast, because the yielding nature of the fish would bring about a distortion of parts in a piece-mould; therefore a waste-mould must be employed in the first operation. The piece-mould exercises the skill of the operator and his judgment. No explanation of the process could teach it so readily as the examination of the thing itself, and an old piece-mould can easily be obtained in London, or similar cities, and this resource of casting is not likely to be employed where such a thing is not obtainable.

SKIN DRESSING.—It is a standing difficulty with many sportsmen how best to prepare the skins of animals, so as to make of them the supple and beauti-

ful leather that leaves the hands of the professional furrier; and thus to make the skins available for wearing apparel, rugs, etc., worked according to taste. The right way to proceed is the following: Let us suppose the subject to be the dried skin of an Indian Leopard. The skin must first be sponged on the flesh side with "liquor" till it is softened, and then it must be properly "shaved." It must then be partially dried. When in this condition the skin should be folded with the hair inwards, and the edges should be fastened together with stitches at intervals of about 12 inches. The object of this is, that the operator may subject the flesh side to the action of grease. For a Leopard, about 3 lbs. of lard will be required; this is the proper grease: butter turns rancid in the skin, and therefore must not be used. The usual mode is to put the skin into a clean tub with the grease, and to tread or knead it with the naked feet, till the action and the natural heat have caused the fat sufficiently and equally to penetrate the fibre of the pelt. The skin may then be laid open and "shaved" a little thinner on the flesh side. The next operation is to clean the fur. To do this, place the skin on a bench with the hair uppermost, and cover it well with fine mahogany dust procured from a veneer mill. Rub this powder with the hand well into the fur, so that it absorb all the grease, and at the same time it will cleanse the coat; and after the skin has been sharply beaten with light canes until the dust has all been removed, the natural brilliancy of the specimen will be restored. A process perhaps more convenient to many persons, but not so effectual, is to rub the grease in with the hand.

HUNTING FIELDS OF THE WORLD.

FOLLOWING are memoranda concerning some of the principal regions of the world which can be resorted to for big game, and where natural historical trophies of interest and value may be collected with advantage, while noble sport is pursued. It must, however, be borne in mind, that in almost every sparsely peopled country, and in many untrodden districts and islands not alluded to here, the study of natural history can be followed by collecting examples, or even specimens of new species and varieties, with absorbing interest and to the aggrandisement of science. The range of such fields is almost inexhaustible: and it includes countries, the fauna and other natural productions of which are imperfectly known to European naturalists, because (as may be said of the Chinese empire), they have been hitherto almost unvisited by them in a scientific sense. No attempt is made to give anything like a complete list of the animals to be found in any particular resort, but simply to supply some information of those most likely to be encountered, which may serve as an indication to the enterprising hunter.

SCANDINAVIA AND THE NORTH.—The accessibility of these grounds from England, the general healthiness

of the climate, and certain conveniences of transit, etc., which can be commanded, recommend them. In Denmark Proper there are none of the larger or important *carnivora*. Sweden and Norway, however, which occupy the peninsula, in their great mountains and forests afford retreat for several animals of interest, as well as for numberless game and raptorial birds. There are many water-fowl. In fact, this is a breeding-ground for hosts of the European birds, who migrate thence, and are familiar elsewhere at certain seasons. It may be as well to note that on private lands the sportsman gets permission from the owner, and generally pays for it; no license is required. But on Government lands in Norway a license is needed. Shooting from a boat on the coast probably is allowed by law, but in certain cases may require permission. The fishing, both freshwater and marine, is very good, especially for salmon. Many of the best salmon rivers in Norway are leased to English sportsmen. Snow covers the ground during seven months of the year, and this gives a peculiar character to much of the sport. Formerly the predatory animals were very numerous and destructive; they are plentiful still, but are now confined principally to the northern forests and the mountains.* The inhabitants of infested districts protect their cattle by general hunts or battues, and by many ingenious systems of snaring. The Brown Bear (*Ursus Arctos*), the largest and most formidable of the Scandinavian *carnivora*, is seldom

* A Swedish Government return shows that in 1827, throughout thirty-four provinces, there were killed by beasts of prey, 35,548 head of horses, horned cattle, sheep, goats, pigs, etc., belonging to farmers; and the estimated loss from this cause was in that year £15,000.

encountered save in Dalecarlia and the northern parts of the peninsula. This animal grows till he is twenty years old, and is sometimes found of great size and strength, weighing four or five hundredweight. Wolves are to be found in plenty; the Glutton, or Wolverine (*Ursus gulo*, Linn.), can be got in the forests of Dalecarlia, and more plentifully among the Lapland Alps farther north. Badgers. Foxes can be met with all over Scandinavia—the red, the black occasionally, and the Arctic white, mostly in the extreme north. There are, besides, Lynx, Marten, Weasel, Polecat, Ermine, Otter, etc. The noblest of the animals is probably the Elk, the largest of the *Cervidæ*; but, although protected, they are getting rare. In the province of Scania they were once numerous, but have now quite disappeared from there. The Reindeer is in like manner becoming scarcer, save in a domesticated condition; but these noble creatures may be still found wild in the Dalecarlian and Koelen mountains. There are also Red Deer and Roebuck. Of raptorial birds, the Golden Eagle will be found; and in Sweden only (and even there it has become scarce), the Great Bustard (*Otis tarda*, Linn.), the largest of European *Aves*. It used at one time to be common in Scania. It is sometimes, however, seen in Denmark. The Great Horned Owl (*Strix bubo*), and at the extreme north, in Lapland, the large Owl (*Strix Lapponica*), are to be found, as well as the Snowy Owl (*Strix nyctea*). The game birds are fine and plentiful. This is the head-quarters of the grouse genus. First among these is the Capercali, or Capercailzie (*Tetrao Urogallus*), the largest of the European *Gallinæ*. He is to be found in all the woods; in fact, wherever the pine tree flourishes, but best in the hilly dis-

tricts. Those of the south weigh sometimes 16 lbs. or more; those captured in the north not so much. Blackcock (*Tetrao perdrix*, Linn.) are more numerous than the Capercali. Hazel-grouse (*Tetrao Bonasia*, Linn.) are abundant in the woods and on the hills of the northern parts. Ripas, both of the valley and mountain species; the Dal Ripa (*Tetrao lagopus*, Linn.), mostly in the northern wooded districts and on the islands; and the Alpine Ripa (*Lagopus Alpina*)—by some considered identical with the Scottish Ptarmigan—which is mostly found on the Alpine ranges and on the Norwegian islands; it haunts stone and shingle. The common Partridge (*Perdix cinera*) is not very plentiful. The Quail (*Perdix coturnix*) is to be met with, but not numerously; it is migratory and rare, especially in Sweden; there are a few in Norway. The Woodcock (*Scolopax rusticula*, Linn.) is scarce, and getting scarcer; these birds, however, are to be met in considerable numbers, sometimes on the western coasts at spring and fall; there are also Snipe, etc. Aquatic birds are wondrously plentiful on all the lakes and rivers. Fine shooting of this description is to be had in almost any part of Sweden or Norway; but the best is probably at Nordholm. Sport is good, too, on the Skärgård, or belt of islands. Of the swimmers, the principal are—Swan, Goose, Goosander, Merganser, Mallard, Teal, Golden Eye, Tufted Duck, Widgeon, Long-tailed Hareld (*Harelda glacialis*), Black-throated Diver, Red-throated Diver, Great Black-backed Gull, Common Gull, Black Tern, and Caspian Tern, etc. The scarce Steller's Western Duck (*Anas dispar*) may be encountered, and should be carefully looked for as a prize. Eider Duck is found on the western coasts.

IN THE ARCTIC SEA.—Proceeding farther north, remarkable sport is to be obtained amid the ice of the Arctic Sea, by Spitzbergen, near Deeva Bay and among the Thousand Islands, commencing in July. Walrus or Sea Horse, and several species of the valuable fur-bearing as well as common hair seals will be met with. They must be harpooned as well as shot; they are seldom killed by the gun unless they are hit in the brain, which is at the back of what appears as their head. Polar Bears (*Thalarctos maritimus*) may be encountered here. Polar Foxes and Reindeer can be collected on shore. The Bears are often of prodigious size and strength, sometimes, say, 8 ft. in length, 4 ft. 6 in. high at shoulder, and weighing 1200 lbs. or more. Many large cetaceans are in the sea; and sea-fowl are numerous.

The recent journey (1888-89) by the Earl of Lonsdale up to the Arctic was notable for its hardy enterprise as well as for the trophies obtained. It occupied about a year, and the distance covered is an indication of the traveller's sustained energy in face of (to him) climatic difficulties. He started from Winnipeg in the middle of March, 1888, and went to Troy, thence to Prince Albert, on the North Saskatchewan, on to Green Lake; across Buffalo Lake, to Menthartorlage, and Clear Water River. He went on to Chippewawar, on Lake Athabaska, after which Peace River was reached, and next the Great Slave Lake, and Hay River. From this point Lord Lonsdale went by steamer to Peel River, and on to the Arctic. He and his party went around Banksland on to the edge of Melville Island, and back to the Mackenzie, from which he walked across the mountains to Yerkon, a distance of eighty miles, then

obtaining a boat on the Porcupine River, he descended into Alaska. He went down the Ajuko, but when he had progressed twelve hundred miles, was stopped by the ice setting. He ultimately arrived at Katmai about February 10th, 1889. His journey was fraught with incident and difficulties, which he surmounted. He found many Indians dead from starvation on his route; great ice obstacles had to be faced, heavy fogs encountered; the temperature was sometimes sixty-four degrees below zero. He visited the Esquimaux. Lord Lonsdale collected Musk Ox (*Ovibos moschatus*), Bison (*B. Americanus*), Moose (*Alces Malchis*), Caribou (*Tarendus Rangifer*), Rocky Mountain Goat (*Haplocerus montanus*), Polar Bear (*Thalarctos maritimus*), etc., and a very fine collection of Birds.

RUSSIA.—Most of the species of animals and birds inhabiting Sweden and Norway will be found in northern Russia and Siberia; indeed, it may be said that in some part or other of this vast empire all, or nearly all the wild creatures native to Europe may be found. Besides the great Brown Bear (*Ursus Arctos*), another, the Siberian Bear (*Ursus collaris*), is to be met with; the Musk Ox (*Ovibos Moschatus*) in the high latitudes; and in the forest of Bialowicza, in Lithuania, to the eastward of the Baltic, the mighty Aurochs (*Bison priscus*), the ancient European Bison of the Pliocene period. This last named wild bull, one of the noblest of animals, more than 6 ft. high at the shoulders, is very rarely to be got at, and is rapidly becoming extinct. It is closely protected and preserved for the private sport of the Czar and the Imperial family. It exists also in certain districts of Moldavia and Wallachia, and is found sparsely in some

parts of the Caucasus. There are plenty of Wolf, Fox, Lynx, Otter, Sable, and other fur-bearing animals. Of birds, there are several species of Eagles and other *Raptores* not met with in Sweden and Norway.

THE MEDITERRANEAN AND ADRIATIC.—Particularly for those who possess yachting advantages, the Mediterranean coasts and islands, as well as Dalmatia and Albania on the Adriatic, offer pleasant opportunities of sport, especially in regard to birds. Of mammals, the most notable is the Moufflon Sheep (*Ovis musimon*), to be had in the islands of Corsica, Sardinia, and (not so numerous) in Cyprus; they are in the forests; September and October are the best months. The species in Sardinia is most esteemed by some hunters, as the ewes there are generally horned. In Corsica are plenty of wild Hogs, Stags, etc.; but in Greece and Turkey, as well as on the islands, there are many other mammalia of ordinary species. Good Wild Goose shooting is to be had on the grassy plains of Southern Spain. The largest and best of these birds to be had there is the *Anser Cinereus*, which, unlike some of the others, is good eating. Good Duck and Snipe are to be found as well on and around the shallow lakes or *lagunas* that abound. On the African coast, the Bush Goat or Barbary Deer (*Cervus Barbarus*) can be collected. Albania is a principal resort. The birds, especially waders and swimmers, are plentiful there, and in many other parts. Some of the most noticeable are the following:—The Balearic Crane (*Balearica pavonina*), getting scarce; Rosy Flamingo (*Phænicopterus ruber*, Linn.); Purple Waterhen; plenty of Snipe, Heron, Bittern, and other waders; Audouin's Gull, mostly about Corsica and Sicily; White-eyed Gull, among the Grecian Islands; Slender-billed Gull

(*Larus tenuirostris*), especially on the African coasts; the Black-headed Gull is to be found in these seas, and especially in the marshes of Albania and Dalmatia, where it breeds. The Great Black-headed Gull, from the Caspian and Red Seas, is seen occasionally about the Ionian Islands; the Algerian Cinereous Shearwater (*Puffinus cinereus*, Cuv.). Sometimes, but rarely, and in hard weather, the Snow Goose comes from Northern Asia and America; and the Blue-winged Goose and the Little White-fronted Goose are found in Greece. The rare Marbled Duck can be got in Sardinia, and near Tunis in January and February; and it has been seen in the Ionian Islands. There are plenty of Cormorants. The White and the Dalmatian Pelicans can be found all about Greece and the Ionian Islands, on the borders of lakes and rivers and in the swampy parts. There are many fine species of the *Falconidæ* to be collected. Francolin Partridge (*Tetrao francolinus*, Linn.) are to be had in the Grecian Archipelago, Turkey, Sicily, Malta, etc.; and the *Perdix rufa*. The Greek Partridge is getting scarce. The perching-birds are not greatly dissimilar to the other European species; but among them may be pointed out the Hoopoe, the Roller, the Golden Oriole, and the Bee-eater.

INDIA.—This is the best field for sport in the Empire; and under the conditions assured by British occupation, sport can be had with reasonable convenience. If the sportsman be furnished with letters to the proper persons, the means and appliances of sport can be everywhere obtained, and the traditional hospitalities of the East everywhere enjoyed; but these introductions are a *sine quâ non*. Without the aid of the officials no good or successful sport

can, as a rule, be had. The magnificent hospitalities to sportsmen of the Maharajah of Cooch Behar, who visited this country in 1887, are famous. His territory abounds in game, and he himself is one of the keenest and most able of sportsmen.

For purposes of sport India may be divided into four tracts:—*First*, the Himalaya tract; *Second*, the Tarai and other sub-Himalayan forests and plains; *Third*, the open country lying between the preceding and the next; and *Fourth*, Central and Southern India, lying south of the more or less cultivated plains of the Ganges and Jumna, and the deserts of the south-western Punjab.*

The first zone embraces the entire system of mountains bounded on the north-west by Afghanistan; on the north by Central Asian States, Thibet, Nipál, Sikkim, and China; on the east by China, and the practically unknown mountains, containing the springs of the great Burmese rivers. Within these limits we have included Kashmír, as it is open to the British sportsman. The states above named on the north are practically closed to him at present. Even in the portions penetrable many thousands of square miles are still, to all intents and purposes, unexplored. All the sport throughout the mountains must be followed on foot, and most of it must be got by laborious stalking. The finest physique and the pink of condition are necessities to him who hopes for success. But for him who, to the above qualities, unites perseverance and a

* The intending sportsman should inspect the great Trigonometrical Survey of India while he is planning his journey. This magnificent work is on the scale of 4 miles to 1 inch. The map set up would cover 56 feet square. It is a Government survey of the greatest exactness and value. It can be seen at the British Museum, and there is a fine copy in the Crystal Palace Library.

well-organised kit, this splendid range offers the widest scope of sport in the finest climate of the world.

In the extreme north-west, in Kashmír, is to be found the Kashmír Stag (*Cervus Wallichii vel Cashmeriensis*), the *Bárasingha* (twelve-tined stag) of sportsmen, with one exception (*vide infra*) the largest known Asiatic deer: it is not found east of Kashmír. In Kashmír and adjacent ranges are also to be found the Ibex (*Capra Sibirica*) and two well-marked varieties of the Márkhor (*Capra Megaceros*) and *Capra Jerdoni*. These two magnificent goats are also to be met with southwards and westwards within the Sulaiman and other ranges, not within British India, and hardly open to sportsmen. The Ibex certainly, and probably also the Márkhor, is found as far south as Bilúchistán and the mountainous borders of Sindh. East of the River Beas the Márkhor is not met with; nor does the Ibex occur, save perhaps as a scattered individual, east of the river Sútlej. Very much within the same habitat, but more widely spread to south and east, is the Uriál (*Ovis Cycloceros*). The *Ovis Ammon*, the great prize of the hunter, the *Kemas Hodgsoni*, or Thibet Antelope, the Yák (*Poephagus Grunniens*), and the *Ovis Vignei* are not found within British India, though a stray specimen of the latter may be picked up on the extreme northern limit of Kashmír. It is perhaps unnecessary to state that *Ovis Poli*, the gigantic sheep of Marco Polo, nowhere approaches near the northern boundary of British India. One of the first and finest heads of this animal came from Colonel Gordon (of the Kashgar Mission), in 1875, and it was exhibited by Mr. Ward, F.Z.S., to the Royal Zoological Society in the same year. The horns (now in the British Museum) measured $65\frac{1}{2}$ inches

round the curve. This trophy was obtained near the Great Pamir Lake. Since then not many have come till quite recently. The wild sheep are very wary and difficult to stalk; they are found where grass abounds on the undulated high plateaux. The immense size and massiveness of the *Ovis Poli* horns raise a supposition as to the size of the animal that is not justified; it is not so great in stature as *Ovis Ammon*, but its horns are trophies of grandest dimensions and character. The height at shoulder of a full-grown male, whose horns measured each 15 inches at base, with a distance between the tips of 38 inches, was 44 inches; and this individual had a girth round the breast of something more than 51 inches. The horns that have reached Europe have been principally found lying on the plains. However, not entirely so; for recently Mr. St. George Littledale succeeded in shooting and bringing home some of the first specimens I have ever mounted. This sportsman, with his wife and some friends, went through Siberia and across Mongolia, but the result in a sporting sense was not very satisfactory, always excepting the capture of the big sheep. Kashmír is now accessible from Agra, with fair convenience. Recent researches would seem to have established the fact that the big sheep known to sportsmen as the *Ovis Ammon* is not entitled to that name, but should be known as *Ovis Hodgsoni*, the real *Ovis Ammon* being a native of Southern Siberia and the deserts adjoining to the south of that country. East of the Sutlej, within our own mountains, the Blue Sheep or *Barhal* (*O. Nahura*) is found, and this sheep thence to Sikkim replaces (*O. Cycloceros*). The Tahr (*Hemitragus Jemluicus*), the Saráo (*Nemorhædus Bubalina*), the Gural (*N. Gural*), the Sámbar or Jaráo (*Rusa*

Aristotelis), the Kákar or Barking Deer (*Cervulus Aureus*), and others less important, are common to the entire Himalayan tract. In the extreme east of this tract, and perhaps hardly within our boundaries, is found the Shou or Sikkim Stag (*C. Affinis*). This is the largest deer in Southern Asia, standing sometimes 15 hands high. It rivals, or at least closely approaches, the American Wapiti in size. It has very seldom been shot, and is consequently a great prize.

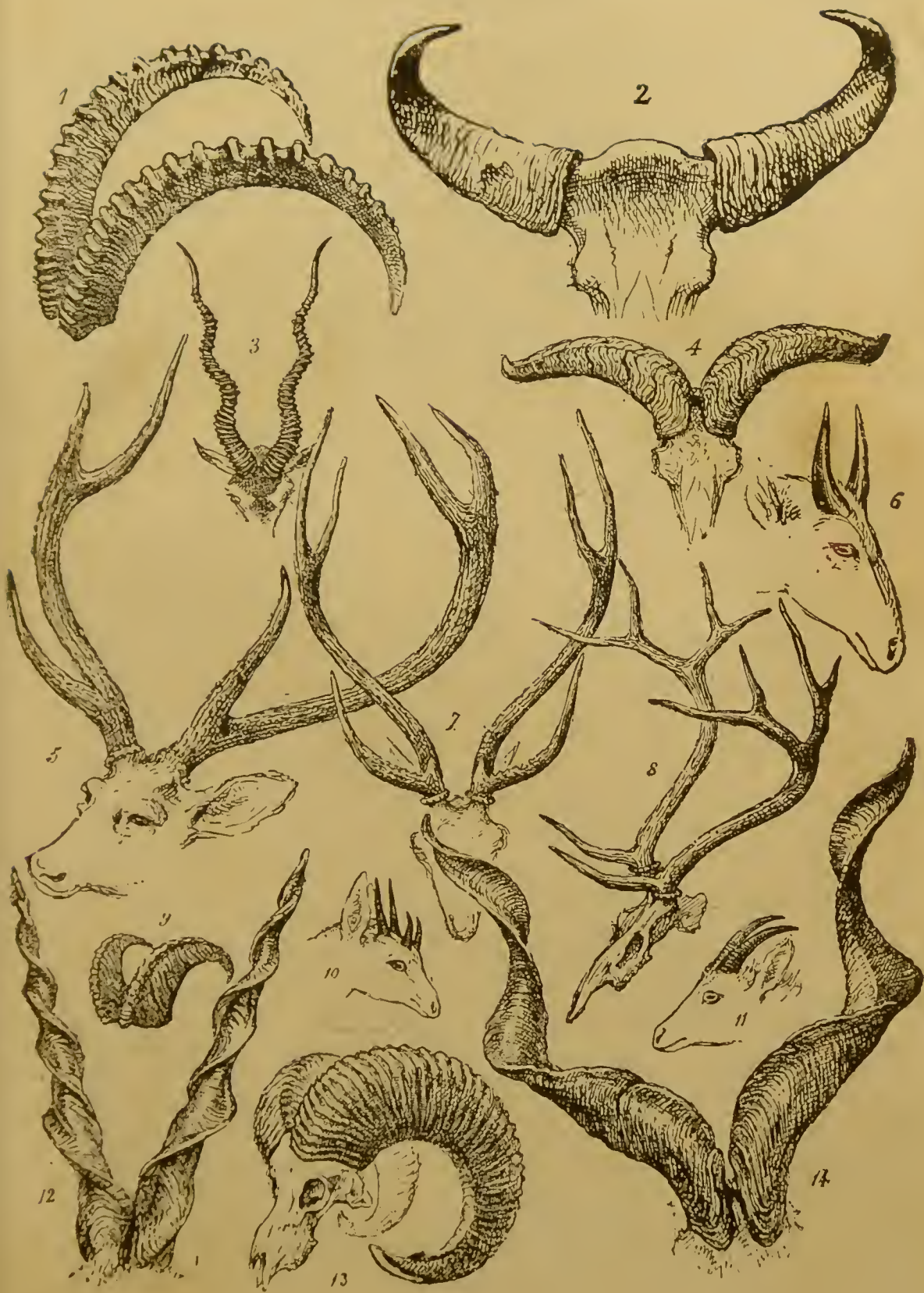
Among the *Felidæ*, the Tiger (*F. Tigris*), the Leopard (*F. Pardus*), the Ounce or Snow Leopard (*F. Uncia*), and many smaller cats, some most beautiful in pelt, are found all over the Himalayas. The clouded Leopard (*F. Diardi*) is only found in the extreme south-east of the tract in question, if indeed at all within our territories.

In the outermost southern spurs and offshoots of the Himalayas, and in the Dúns or valleys within them, from the River Jumna eastwards, the wild Elephant (*Elephas Indicus*) is found nearly everywhere during the hot, dry months. During the cold weather and rains these animals are chiefly out in the swamps and forests of the next zone of sport. They are most numerous in the extreme east and the extreme west of the tract here indicated. Their destruction is prohibited, save in the case of solitary elephants which have notoriously developed dangerous habits, and even then they may be shot only with special permission. In the west the wild elephants are caught by noosing them individually, and in the east by enticing the herd into a stockade, and enclosing them *en masse*. By the former mode twenty were recently caught by a well-organised party in one day; while, by the latter, Mr. G. P.

INDIA.

1. Ibex. *Capra Sibirica*.
2. Gaur (Indian Bison). *Gavæus Gaurus*.
3. Sasin—Indian Antelope (Black Buck). *Antilope Bezoartica*.
4. Barhal. *Ovis Nahura*.
5. Sámbar. *Rusa Aristotelis*.
6. Nilgai. *Portax Pictus*.
7. Axis. *Axis maculata*.
8. Swamp Deer. *Rucervus Duvaucellii*.
9. Tahr, or Jhâral. *Hemitragus Jemlaicus*.
10. Four-horned Antelope. *Tetraceros quadricornutus*.
11. Saráo. *Nemorhædus Bubalinus*.
12. Márkhor (Trans-Indus). *Capra Jerdoni*.
13. *Ovis Ammon*.
14. Márkhor. *Capra megaceros*. (This one has a white beard. It is rarer than that in the Trans-Indus habitats.)

* * A Book of Horn Measurements and other statistical information is kept, for the information of sportsmen, at 166, Piccadilly.



Sanderson, the well-known author of "Thirteen Years Among the Wild Beasts of India," who is the Government elephant catcher, succeeded in capturing, *at one haul*, over 140 wild elephants.

Of Bears, the Brown Bear (*Ursus Isabellinus*) is confined to Kashmír and the further N.W. Himalayas. In the centre and E. the Black Bear (*U. Thibetanus*) takes its place; while along the outer fringe of the hills to the south the Sloth Bear (*U. Labiatus*) alone is found.

The game birds of the Himalayas are not only numerous and varied, but they are almost all exceptionally magnificent in plumage. There are five well-marked species of partridge: the Snow Partridge (*Lerwa Nivicola*), found everywhere above 9000 ft.; the Black Partridge (*Francolinus vulgaris*), everywhere below 8000 ft.; the *Chakkor*—almost identical with the "Frenchman" in appearance—(*Caccabis Chakkor*), everywhere below snow-level; the *Seesee* (*Ammoperdix Bonhami*), in the N.W. Himalayas, below 7000 ft.; the *Pyúra* (*Arboricola Torqueolus*), in centre and E., below snow-level. Of this last there are four varieties.

The *Phasianidæ* are represented by eight kinds:—The Pea-fowl (*Pavo Cristatus*), in the valleys of the lower outer ranges everywhere; the Peacock Pheasant (*Polyplectrum Thibetanus*), in the E. Himalayas, below 6000 ft.; the *Munál* (*Lophoporus Impeyanus*), almost everywhere between 6000 ft. and snow-line; the Crimson Tragopan (*Cerionis Satyra*), in centre and E. Himalayas, from 8000 ft. to snow-line; the Western Tragopan (*C. Melanocephalus*), in the W. and N.W. Himalayas, from 8000 ft. to snow-line. (One or both of these Tragopans are constantly mis-

called "Argus Pheasant" by sportsmen. The true Argus Pheasant is confined to the Malay Peninsula; and if it occur within British possessions at all, which is doubtful, it is only in the extreme S. of Tenna-serim.) The Blood Pheasant (*Ithagenes Cruentus*), in centre and E., on and above snow-line; the *Kakláz* (*Pucrasia Macrolopha*), all over the west central, W. and N.W. Himalayas, from 4000 to 10,000 ft.; the *Kálij* (*Euplocamus Albocristatus*), as preceding, but down to 2000 ft. This is the commonest pheasant in India, and there are several varieties of it.

The Snow-cock (*Tetraogallus Himalayensis*) is found, but sparsely, from west central to N.W., from 8000 to 10,000 ft., while the Red Jungle-fowl (*Gallus Ferrugineus*), one of the progenitors of our barn-door fowls, is found everywhere in the outer spurs and valleys in great numbers.

The Woodcock (*Scolopax Rusticola*) is distributed all over the Himalayas, coming down to very low elevations in the winter time, and not seldom appearing within the next zone.

The Great Thibet Sandgrouse (*Syrrhaptes Thibetanus*) is sometimes found along the extreme N.W. boundary of British India.

Our second zone of sport is the Tarai and other sub-Himalayan forests and plains. The "Tarai," literally, damp tract or swamp, is that portion of the sub-Himalayan forests where the springs crop up to the surface, at the edge of the more or less sloping tract formed by the detritus at the very foot of the hills. This latter dry, or comparatively dry tract, where it occurs, is known as *Bhábar*. The Tarai, properly so-called, is not continuous. It is not found west of the Kosi in the district of Moradabad, nor is

it unbroken to the east of this. It is heaviest to the extreme east. West of the Kyárda Dún (Nahun) this zone of sport is entirely non-existent. There is no forest and wild belt between the plains and the hills west of this. Indeed, as we have practically included the Dun (Dehra Dun) within the first zone, this second zone may be held to commence from the Ganges at Hurdwar. Thence to the extreme east of Assam lies the tract we now write of. It is in some places only three or four miles wide, and in some thirty or forty. It is almost all densely wooded, or covered with heavy grasses, reeds, or "flags." Swamps are numerous and dangerous, and many are quite impracticable. Herein shooting may be said to be entirely carried on from howdahs upon elephants, and with elephants as beaters. No other means are possible in such jungles. Organisation without flaw, and a good leader are indispensable to success. Here are found in plenty the Wild Elephant, the Tiger, the Leopard, the *Sámbar* (here never called *Jaráo*, and locally in the N.W. known as the *Máhá* = big), and the Sloth Bear mentioned above. In addition there are the Panther (*Felis Leopardus*), the Spotted Deer (*Axis Maculata*), the Hog Deer (*A. Porcinus*), the Four-horned Antelope (*Tetraceros Quadricornutus*), the *Nílgai* or Blue Bull (*Portax Pictus*), the largest of the Asiatic antelopes, the Hyæna (*H. Striata*), and here and there in the N.W., but not in the E., the Red Lynx (*Felis Caracal*). The Swamp Deer (*Rucervus Duvaucellii*) was formerly common everywhere in this tract in suitable localities. It is now not to be found, save as a straggler, west of the River Kicha, in the Tarai district of the N.W. provinces, and is no longer common west of the Sárdá or Sarjou (the Gogra of the

plains). This fine deer is sometimes erroneously called the *Bárasingha*. It seldom has so few as twelve points, and often bears sixteen and seventeen. The true *Bárasingha* is, as has been stated, the Kashmír Stag, which carries as a rule twelve points. The mistake arose from a name sometimes given to the Gond of *Bárrasingha* (Burrasingha) or big-horned.



FROM THE TROPHY OF COOCH BEHAR. ROWLAND WARD, F.Z.S., fecit.

In the centre and eastwards of this zone the Indian Rhinoceros (*R. Indicus*) and Wild Buffalo (*Bubalus Arnee*) are found, being most numerous towards the east. In the western portion of the above habitat the Rhinoceros is seldom found south of the Nipál border; but, with suasion from the proper quarters, permission

to shoot a few can be procured, only with difficulty. In the extreme east of the zone of which we are writing, in Assam and adjacent parts, are found the *Gaur*, or Indian Bison (*Gavæus Gaurus*), and the *Gayal* or *Mitham* (*G. Frontalis*); the former rare, the latter fairly common.



ARNEE. TROPHY OF COOCH BEHAR. ROWLAND WARD, F.Z.S., fecit.

On the southern fringe of the west portion of this zone the Indian Antelope (*A. Bezoartica*) is sometimes found in herds. The male of this Antelope is well known as the Black Buck.

In the Sundarban (Sunderbunds), being the low salt marshes and swampy forest-clad delta of the Ganges (Hooghly and Megna), the Tiger, Rhinoceros,

Swamp Deer, Hog Deer, Spotted Deer, and Buffalo are said to swarm. Not much is known of these jungles, and their climate, at even the best part of the year, is deadly in the extreme.

Of Game Birds this second zone of sport cannot boast of a long list. Besides the Black Partridge, the Pea-fowl, and the Red Jungle-fowl, mentioned in zone the first, there are the Grey Partridge (*Ortygornis Pondicerianus*), and in east centre and east, the Swamp Partridge (*O. Gularis*). The Florican (*Syphiotis Bengalensis*), though sometimes found in the west of the tract under notice, is most common in the centre and east. It is perhaps the best Indian Game Bird for the table. The Red Spur-fowl (*Galloperdix Spadiceus*) is sometimes procured. The usual migratory birds—Sand-grouse (two kinds, *Pterocles Arenarius* and *Etustus*), Snipe, Quail, Duck, etc., are of course common in suitable places at the proper season.

Our third sporting zone is the open country lying between the sub-Himalayan zone on the north, and central and southern India, commencing from the edge of the cultivated plains south of the Ganges and Jumna. Here, in suitable localities, are found the Black Buck and his harem, the Gazelle (*G. Bennetti*), the Nílgai described above, and here and there along rivers the Hog Deer. Hares, black and gray Partridges, Plovers of several kinds, and the rest of the usual migratory game birds, are everywhere in tolerable plenty. In a few sharply-defined localities the Florican, the Great Indian Bustard (*Eupodotis Edwardsi*), the Houbára (*H. Macqueeni*), and the Litch or Lesser Florican (*Syphiotides Aurita*), are to be found, but these are nowhere numerous in this tract.

The fourth of the sporting tracts into which we

have roughly divided India is the high central plateaux and hill ranges which are spread all over central and southern India, south of the Ganges and Jumna valleys. All over this immense tract of country sport is almost invariably carried on on foot. Elephants could not be used as beaters from the broken nature of the ground. Indeed, they are rarely used at all, save where wounded dangerous game has to be followed up in a place where elephants *can* go. When hunting dangerous cats the guns are generally posted on platforms (*machán*) in trees, in trees without platforms, or on the vantage ground afforded by a high rock, or the edge of a precipitous ravine. The beating is done by men with drummers scattered among them.

The large game of this tract comprises all that which has been allotted to the second zone, save the Rhinoceros and the *Gayal* or *Mithan*. In addition, the Hunting Leopard or *Chíta* (*F. Jubata*) is found. It is used in a semi-tame state for hunting antelope. In a very circumscribed area in the extreme N.W. of this tract is still found the Asiatic Lion (*F. Leo*). Its numbers are small, so small that it may almost be said that a census is kept of them, and they are more or less preserved. In the Nílgiiri mountains and the neighbouring ranges, and in parts of Mysore, is found the so-called Nílgiiri Ibex (*Hemitragus Hylocrius*).

The Tiger and Panther are found everywhere in this tract. The Elephant is only met with in the extreme N.E., and in the wide-spread mountainous region of which the Mysore plateau is the centre. In these hills, and the interlying valleys, are numerous herds. The Buffalo is almost confined to the N.E.

portion of this zone; while the so-called Bison (*Gaur*) is found almost all over it in suitable localities. The Sámbar, Spotted Deer, and Hog Deer, are fairly ubiquitous, and the Swamp Deer is found here and there in ground which suits its habits.

The Game Birds of this tract are those of the second and third zones, save that the Painted Partridge (*Francolinus pictus*) takes the place of the Black Partridge; the Grey Jungle-fowl (*Gallus Sonnerati*) that of the red variety; and the Painted Spur-fowl (*Galloperdix Lunulatus*) that of the Red Spur-fowl.



WILD BOAR (*SUS SCROFUS*) FROM COOCH BEHAR.

The Great Indian Bustard is found much more plentifully than in the third zone of sport, most so in Mysore. The Florican is not found; but the *Líkh* or Lesser Florican is tolerably common. Besides the two kinds of Sand-grouse mentioned in the second zone, a third, the Painted Sand-grouse (*Pterocles Fasciatus*) is found in due season.

Wild Hog are found all over India, in suitable ground, but are never shot by sportsmen where they can be ridden at with the spear.

CEYLON.—Elephant (*Elephas Sumatranus*) is the most important of the indigenous fauna, and exists in considerable numbers all over the island, excepting the populous parts. His favourite resort is the mountain tops; there are, however, not so many now as formerly. The species is almost always comparatively tuskless. Buffalo abound in all parts of the island, but most in the solitudes of the Northern and Eastern provinces. Gaur is said still to exist in some districts, but if so it is very rare. Sámbar, often called Ceylon Elk (*Rusa Aristotelis*), on the mountains; Spotted Deer (*Axis maculata*) and Muntjak (*O. vaginalis*), in the forests of the interior, are the principal *Cervidæ*. Of *Carnivora*, Bear (*Ursus labiatus*) are in the thick woods of the low, dry district on the northern and south-eastern coast; Leopard (not Chítah, as they are sometimes erroneously called), and a rare variety, quite black (*Felis melas*), can be got; Mongoos (*Hephestes vitticollis*) is comparatively common; Palm Cat (*Paradoxurus typus*), Genette (*Viverra Indica*). Only one example of *Edentata*, the Pengolin (*Manis pentadactyla*), or Scaly Ant-eater, is found. There are four species of Wanderoo Monkeys: some which inhabit the lowland woods; and others, the largest of which is the *Presbytes Ursinus*, are met only on the mountain zone. The rare *Presbytes Thersites* may be sought for, and a white variety may sometimes be captured. *Cheiroptera* are very numerous; the most curious of them is the Rousette (*Pteropus Edwardsii*), commonly called the Flying Fox. The birds are numerous and interesting. There are remarkable Cetaceans in the sea, among which is the Dugong (*Halicore dugong*).

INDIAN OR MALAY ARCHIPELAGO.—This is a wondrous region, full of natural historical wealth, and probably, in many respects, less known to science than any other part of the world. The islands are of vast importance. Borneo is more than twice as large as all Great Britain. New Guinea is larger than Borneo. Sumatra is as large as our whole home empire; and there are numbers of other islands, like Java, as extensive as Ireland or Jamaica. The great islands, Sumatra, Borneo, and Java were probably at one period part of the Asiatic Continent, and in them the animals and other natural productions are, many of them, of the Asiatic forms—some of identical species. In like manner New Guinea was, doubtless, connected with Australia, and we find there the Australian forms, both of animal and vegetable. On the Malayan peninsula Elephant, Rhinoceros, and Tiger may be got, and a few of the last-named game on the island of Singapore. On the mainland some of the birds are of great beauty. The true Argus Pheasant (*Argus giganteus*) is in the thickest forests: it is very shy and wary, and runs among the trees so swiftly and quietly that it is very difficult to collect. It is generally snared. The beautiful Eastern Trogons may be obtained here, and should be looked for in the deepest woods; the Blue-Billed Gaper (*Cymbirhynchus macrorhynchus*), the Green Gaper, Green Barbets (*Megalæma versicolor*), and other rich birds should be carefully preserved when captured. In the three great islands already named, Sumatra, Borneo, and Java, although the Asiatic forms prevail, there are several distinctive races. The Mias,* or Orang-utan

* Mr. Wallace records the following dimensions of a large old Mias killed by him: height, 4 ft. 2 in.; arms, from tip to tip of fingers, 7 ft. 9 in.; face, 13½ in. wide; girth of body, 3 ft. 7½ in.

(*Simia Satyrus*), is found only in Sumatra and Borneo. Another species (*Simia Morio*), a little smaller, is only found in the same islands; the large Siamang only in Sumatra and Malacca. These great *Simiadae* are peculiar to these regions.

SUMATRA.—The Mias, or Orang-utan, the Siamang, and *Simia Morio*, mostly in the low swampy forests. Elephant (getting scarce), Rhinoceros (*R. Sumatrensis*, two-horned); *R. Javanus* (one-horned) is said also to be in the woods; Tapir (*T. Malayanus*); Tiger; the Black variety of Leopard (*F. melas*); Balu Leopard (*L. Sumatrensis*); the rare Leopard (*F. macrocelis*), sometimes called the Clouded Tiger, having markings which partake of both characters; the Flat-headed Lynx (*F. Planiceps*) and Golden Tiger Cat (*F. aurata*) are among the principal *Carnivora*; the Black Ox of Sumatra (*Bos Banting*), somewhat resembling the Gaur. Of *Cervidae*, the Banjoe, or Black Stag (*Cervus Hippelaphus*), Samboe (*Rusa equinus*), and Spotted Deer (*Axis maculata*) will be found; and Antelope (*Capricornis Sumatrensis*) in the hill forests. Sun-Bear (*U. Malayanus*); Squirrels are very abundant and curious; Argus, and some Ocellated Pheasants; Fire-backed Pheasants (*Euphocamus ignitus*); Bronze Cock (*Gallus xeneus*), and *Gallus giganteus*. There are no Pea Fowl on this island, although it is nearest to the mainland. There are numerous smaller birds of great beauty and value.

BORNEO.—Mias and *Simia Morio* and the Long-nosed Monkey (*S. nasalis*), which last is found only on this island; Elephant, Rhinoceros. Black Leopards can be often met with. Golden Tiger Cat, Flat-headed Lynx, Sun-Bear (*U. Malayanus*), and a second species (*U. Euryspilus*); the Sumatran Ox (*Bos Banting*);

Samboe Deer (*Rusa equinus*), Spotted Deer (*Axis maculata*). Great Argus, and several pheasants.

JAVA.—Rhinoceros (*R. Javanus*), a distinct species. Tiger, Leopard (*L. Javanensis*), the Black variety (*F. melas*), and Bear (*U. Malayanus*), are the most important *Carnivora*. Banjoe, or Black Stag (*C. Hippelaphus*), Spotted Deer (*Axis maculata*), Muntjak (*C. vaginalis*), Wild Bull (*Bos Banting*). The birds and insects of Java are especially beautiful and various. The Peacock, not found in Sumatra or Borneo, reappears in Java; the species is distinct from the Indian. The Horn-bill (*Buceros lunatus*); *Gallus giganteus*; Jungle Cock (*G. Bankiva*) in plenty; the rare Green Jungle Fowl (*G. furcatus*). The Yellow and Green Trogons (*Harpactes Reinwardti*); the superbly splendid little Flycatcher (*Pericrocotus miniatus*); Black and Crimson Oriole (*Analcipus sanguinolentus*); all these last-named are rare, and are among the most notable to be found only in this island, and probably only in the western parts of it. The Great Crowned Pigeon (*Lophyrus coronatus*) is easily to be met with in this and other islands, but abundantly in New Guinea; so is the remarkable *Geophilus Nicobaricus*. April to September during the dry season is the best time to visit Java.

NEW GUINEA AND NEIGHBOURING ISLANDS.—The forms of both animal and vegetable life on the islands in this division of the Archipelago are mostly of Australian character. But the principal glory of the region in a zoological sense is the possession of a purely distinctive race of *Aves*, the Birds of Paradise. These are all of great value and transcendent beauty, simply forming one of the most beautiful groups in the world. For a long period all that was reported of

their habitat was very trifling, and intermixed with mere fable: though much more is known now, our information is comparatively scanty, and there is no region of the globe so little understood, and yet so calculated to well requite scientific exploration. Mr. A. R. Wallace, who visited the islands for the purpose of investigating the *Paradisæ*, has recorded the best and latest information concerning their range and particular habitat, and the following is quoted from his words ("Proc. Zool. Soc.," 1863, p. 166): "The Aru islands contain *Paradisea apoda* and *P. regia*; and we have no positive knowledge of *P. apoda* being found anywhere else; Mysol has *P. papuana*, *P. regia*, and *P. magnifica*; Waigiou, *P. rubra* only. Salwatty, though so close to New Guinea, has no restricted *Paradisæ*, but possesses *P. regia*, *P. magnifica*, *Epimachus albus*, and *Sericulus aureus*. The island of Jobie, and the Mysory islands beyond it, certainly contain true *Paradisæ*, but what species beyond *P. papuana* is unknown. The coast districts of the northern part of New Guinea contain *P. papuana* and *P. regia* pretty generally distributed, while *P. magnifica*, *P. alba*, and *Sericulus aureus* are scarce and local. Lastly, the central mountains of the northern peninsula are alone inhabited by *Lophorina superba*, *Parotia sexsetacea*, *Astrapia nigra*, *Epimachus magnus*, and *Craspedophora magnifica*; and here also probably exist the unique *Diphyllodes Wilsoni* and *Paradigalla carunculata*." The birds frequent the deepest woods and trackless wilds. The indescribably beautiful Hoopoe, *Promerops* (*Epimachus magnus*), can be got on the coasts of New Guinea, and should be carefully collected and preserved.

AUSTRALIA.—It is the head-quarters of the *Mar-supiata* and of the Parrot tribe. The species of

Marsupialata are distributed in greatest numbers in Western Australia and New South Wales; next in South Australia and Van Diemen's Land. In North Australia the species are neither so large nor so numerous. The Great Kangaroo (*Macropus giganteus*) is to be got in each division but the north; but another species of nearly equal size (*M. antilopinus*) is to be got there. The Great Rock Kangaroo, or Black Wallaroo (*M. robustus*), is found on the mountair



THE ORNITHORHYNCHUS.

ranges in the interior of New South Wales only. The Red Buck (*M. rufus*), also of the largest size, is found in many parts of the interior of Australia, but particularly New South Wales, where also another large species, the *M. Parryi*, abounds. Several species of Opossum and other smaller creatures can be collected. The very curious Duck-billed Platypus (*Ornithorhynchus paradoxus*) and the Porcupine Ant Eater (*Echidna*

Hystrix) should be carefully preserved. The largest of the Australian *Carnivora* is the Tasmanian Wolf, or Zebra Opossum (*Thylacinus cynocephalus*), found now only in the highest mountainous parts of Van Diemen's Land. Of Birds the largest is the Emu (*Dromaius Nov. Holl.*), mostly in the south. The Lyre Bird (*Mænura superba*) is found principally in the forests of the Blue Mountains, but also on the other mountain ranges generally of New South Wales. The curious Kivi-Kivi (*Apteryx Australis*) on all the islands of New Zealand, but most at the southern end of the middle island. An almost infinite variety of Parrots and Pigeons can be collected, as well as many aquatic birds. The Laughing Kingfisher (*Dacelo gigantea*), the Satin Bower Bird (*Ptilonorhynchus holosericeus*), should be looked for, as also the Great Bustard (*Otis Australis*).

AFRICA.—This vast continent is the habitat of countless great quadrupeds, and altogether of a profusion of animal life that is perhaps unequalled on the globe. Vast regions of it are still unexplored, and there is ample verge for enterprise. The number of mammals is most remarkable, and of those peculiar to this continent the proportion is great. This is the true home of the Lion. The large Pachyderms are most numerous here; and the great Antelope tribe has its head-quarters in this division. Among the *Quadrumana* are the Gorilla and the Chimpanzee. In alluding, for the sake of convenience, to Northern, Southern, Eastern, or Western Africa, it should be borne in mind that, although in addition to the great districts or natural divisions on the coasts several vast regions can be referred to with certainty, beyond all these, in the interior, lie fields for the hunter, where discovery of great natural facts may be pursued, while extraordinary sport is obtained.

Southern Africa alone—including in that title all the vast extent of country from the Cape to the Zambesi, and from Walfisch Bay to Quillimane—must be divided as a hunting-field into many different parts, as there are but few species of game to be met with at the present day throughout the entire country, whilst certain animals are quite confined to particular districts.

To begin then with the most southerly portions of the Continent, in Cape Colony the following wild animals may be met with: In the coast region the Bushbuck (*Tragelaphus sylvaticus*), Duiker (*Cephalophus mergens*), Grys buck (*Nanotragus melanotis*), Bluebuck, Leopard (*Felis Leopardus*), Wild Dog (*Canis venaticus*), Bush Pig, Buffalo (*Bubalus Caffer*), and Elephant (*Elephas Africanus*). The latter two animals are protected, but permission can be obtained from Government to shoot one or two of each. Further inland are found the Vaal Rhèbuck, the Red Rhèbuck, the Klipspringer (*Nanotragus oreotragus*), the Steinbuck (*Nanotragus tragulus*), the Oribi (*Nanotragus scoparius*), the Springbuck (*Gazella euchore*). In the Cradock and Beaufort West district, the Bontebuck; a herd is still preserved on Mr. Van der Byl's farm, near the Cape—and a few Chitahs, Hyænas (*H. maculata* and *H. Brunea*), Koodoos (*Strepsiceros Kudu*), and true Zebras (*Asinus Zebra*).

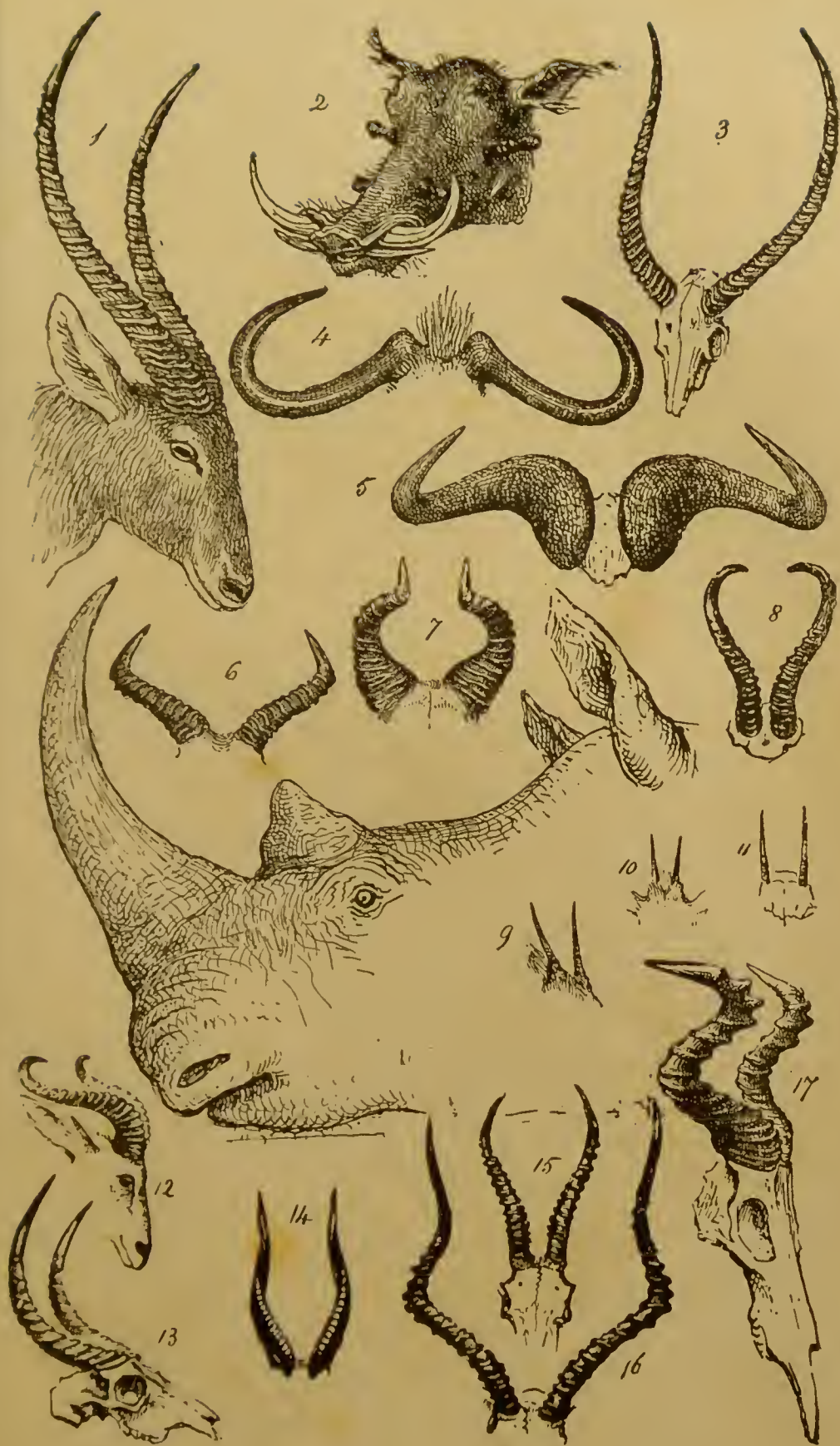
In Natal are found the Bushbuck, Reedbuck (*Cervicapra Arundinacea*), Duiker, Steinbuck, Oribi, little Red Bushbuck, Bluebuck Vaal, and Red Rhèbuck, Klipspringer, Bush Pig, and Leopard.

In Zululand were to be found, a few years ago, Elephants, Rhinoceros of both the black and white species, Hippopotami, Buffaloes, Lions, Hyænas, Wild Dogs, Leopards, Chitahs, Burchell's Zebras, Elands,

AFRICA.

1. Waterbuck. *Kobus ellipsyprymnus*.
2. Wart Hog. *Phacochaerus Æliani*.
3. Lechwe Antelope. *Antilope Leche*.
4. Black Wildebeest. *Connochetes Gnu*.
5. Blue Wildebeest. *Connochetes Gorgon*.
6. Tsessebe Antelope. *Alcelaphus lunatus*.
7. Hartebeest (Lechtenstein's). *Alcelaphus Lichtensteinii*.
8. Springbuck. *Gazella euchore*.
White Rhinoceros. *Rhinoceros bicornis*.
9. Klipspringer. *Nanotragus oreotragus*.
10. Grys buck. *Nanotragus melanotis*.
11. Oribi Antelope. *Nanotragus scoparius*.
12. Mohr. *Gazella Sommeringii*.
13. Reedbuck. *Cervicapra Arundinacea*.
14. Bushbuck. *Tragelaphus sylvaticus*.
15. Blesbok. *Damalis albifrons*.
16. Impala. *Æpyceros Melampus*.
17. Hartebeest. *Alcelaphus Caama*.

* * A Book of Horn Measurements and other statistical information is kept, for the information of sportsmen, at 166, Piccadilly.



AFRICA.

1. Koodco. *Strepsiceros Kudu*.
2. Gemsbuck. *Oryx Gazella*.
3. Situtunga Antelope. *Tragelaphus Spekii*.
4. Sable Antelope. *Hippotragus niger*. (Scalp as
saved on the field.)
5. Roan Antelope. *Hippotragus leucophæus*.
6. Eland. *Oreäs canna*.

* * A Book of Horn Measurements and other statistical information is kept, for the information of sportsmen, at 166, Piccadilly.



Blue Wildebeests, Hartebeests, Koodoos, Waterbucks, Sassabies, Impalas, Inyalas (*Tragelaphus angasi*), Bush Pigs and Wart Hogs, besides all the smaller bucks mentioned as being found in Natal. Nowadays, however, all the more ponderous species of game, and many of the larger antelopes, are either quite or very nearly extinct, though they may all probably still be found in the countries to the north of Delagoa Bay.

In the open plains of the Orange Free State and the Transvaal, herds of Blesbucks, Springbucks, and Black Wildebeests, are still to be met with, but their numbers are becoming less and their range more circumscribed year by year; a few of the smaller species of Antelopes are also found in these territories, whilst in some of the northern and eastern districts of the Transvaal a few Lions, Giraffes, Buffaloes, and some of the larger Antelopes still linger. It is to be noted that Lions are really, as well as apparently, scarce now in South African regions. Their habits are nocturnal; they lie asleep during the day in remote and very close cover, and thus are not encountered so often as other game in ordinary circumstances.

North of the Transvaal, and between the Limpopo and the Zambesi rivers, may be found Elephants, few and far between nowadays, in comparison to what they were; but the great game is very shifting in its own districts. A few years ago (1886), Elephant was reported as abounding on the Shiré and Zambesi, especially on the former river, and they were in great plenty about Lake Nyassa. But to resume as to the North Transvaal regions, besides Elephant, will be found the Black and White Rhinoceros, almost entirely confined to northern Matabele land and portions of the Mashuna country; Hippopotami, plentiful in the Zambesi and all its larger

affluents; Buffaloes, still very numerous along the Chobe as well as on all the tributaries of the Zambesi to the east of the Victoria Falls; Giraffes; Elands; Gemsbucks, entirely confined to the western deserts; Sable Antelopes, very numerous in the Mashuna country; Roan Antelopes; Koodoos; Waterbucks; Hartebeests, whose range is very similar to that of the Gemsbuck; Sassaby Antelopes; Flat-horned Hartebeests, found near the river Sabi, in south-eastern Mashunaland; Impalas; Lechwes, common in the swamps of the Botletlie, Mababe and Chobe rivers; Pookoos (*Cobus Vardonii*), only found in a small district of country on the southern bank of the Chobe; Situtungas (*Tragelaphus Spekei*), only found in the swamps of the Mababe, Machābe, and Chobe rivers; Blue Wildebeests; Burchell's Zebras; Reedbucks; Oribis; Duikers; Klipspringers; Spotted Bushbucks (*Tragelaphus sylvaticus*); Grysbucks; Bush-hogs and Wart Hogs; besides Lions, found throughout the country wherever there is game; Leopards; Chitahs; Spotted Hyænas; Wild Dogs; Red Lynx (*Felis caracal*); Servals (*F. serval*); Gray Cats; Ratels; Otters; Porcupines; Antbears; three species of Jackals, etc.

Many of the birds are very notable, among which may be particularised: Ostrich; Kori Bustard (*Otis Kori*), the largest of the genus, upwards of five feet high, very fine game, found especially in the countries on the banks of the Orange river; another, *Otis Denhami*, always where Gazelles are; and the African Bustard (*Otis cærulescens*). The gigantic Stork (*Ciconia Marabou*). Flamingo (*Phænicopterus ruber*), multitudes in the neighbourhood of Walvisch Bay; and the small species (*P. parvus*) on the lakes; Demoiselle Crane (*Anthropoides virgo*), Secretary Bird (*Gypogeranus Serpentarius*), the superbly beautiful



HIPPOPOTAMUS. ROWLAND WARD, F.Z.S., *fecit.*

Promerops erythrorhyncus, and Golden Cuckoo; Bee-eater (*Merops apiaster*), Roller (*Coracias garrula*), in deep forests; Sun-birds, etc.

In the Congo region good sport has lately been had. The best localities are on the south bank below Vivi to Isangila. In 1886, Elephant was reported as abundant about Stanley Pool, and plenty of game in the Congo State. The best months in the region are September, October, and November.*

Western Africa yields the Gorilla (*Troglodytes Gorilla*), the Chimpanzee (*T. niger*), and two other great anthropoid Apes (*T. Aubryi*), and the rare one described by Du Chaillu, called by him *T. Koolo-Kamba*, as well as *T. calvus*, all of which are valuable. They are found in the most remote woods of the Gaboon district. The very handsome King Monkey, sometimes called Full-bottom, on account of its extraordinary wig-like hair (*Colobus polycomus*), and several other species of *Colobi* can be got near Sierra Leone. The Lion of Senegal is distinguishable by a yellower colour than its congeners, but the mane is mostly inferior. Panther (*F. Pardus*), Leopard, two species (*F. Leopardus* and *F. neglecta*), Striped Hyæna (*H. striata*), Lynx (*F. caracal* and *F. caligata*), Hippopotamus. Of Antelopes: the Mohr (*G. Sommeringii*), Kevel (*G. rufifrons*), Red-crowned Bushbuck (*Cephalopus coronatus*), the White-backed (*C. sylvicultrix*), the Bay (*C. badius*), the Black-striped (*C. Ogilbii*), the Black (*C. niger*), the White Oryx (*Oryx Leucoryx*), Korrigum (*Damalis Senegalensis*), and the Doria, or Gilded Antelope (*Doria Zebra*), a perfect specimen of which is rare in England, and should be sought for.

* See "A Hunter's Wanderings in Africa, being a Narrative of Nine Years spent amongst the Game of the Far Interior of South Africa." By F. C. Selous. With 19 Full-page Illustrations. London (Bentley), 1890.

Of Birds in these countries: the Pheasant-like Touracos, the beautiful *Corythaix Senegalensis*, *C. erythrolophus*, a superb species, *Chizoeris variegata*, and the magnificent *Musophaga violacea*, can be found frequenting the highest trees about the Gold Coast. The Spur-winged Plover (*Philomachus spinosus*) should be sought for, and its habits, of which little is known, recorded; Gigantic Stork (*Ciconia Marabou*), Flamingo, Demoiselle Crane, Crowned Crane (*Balearica pavonina*); Jabiru, a large wader, about the lakes and marshes; Great Kingfisher (*Ispida gigantea*), Secretary Bird, Roller, Sun-birds, etc.

In the Northern countries of Africa will be found: Lion, having in these districts a deep yellowish-brown coat and grand mane; Leopard, Lynx, *F. caracal*, *F. caligata*, and *F. chaus*—the last-named most frequently about marshes and bogs; Striped Hyæna (*H. striata*), Wolf, Jackal; Gazelle (*G. Dorcas*), Addax (*A. nasomaculatus*), plentifully; Bekker-el-Wash, or Wild Ox, as the Arabs call him (*Alcephalus Bubalis*), to the borders of Sahara; in Barbary, the Bush Goat, or Barbary Deer (*Cervus Barbarus*), the only member of the *Cervidæ* on this continent. Among the birds are—Flamingo, Demoiselle Crane, Crowned Crane, Roller, etc. Several Vultures, the Griffon (*V. fulvus*), *V. Kolbii*, *Neophron percnopterus*, and other of the *Raptores*.

North-Eastern and Eastern Africa: Hippopotamus, in the Nile; Elephant, in Abyssinia, where also, on the hills, Mohr (*Gazella Sommeringii*), Andra (*G. ruficollis*), *G. Dorcas*, *G. Isabella*, Oryx (*O. Leucoryx*), and the remarkable Antelope (*Hippotragus Bakeri*) discovered (1868) by Sir Samuel Baker, are principal quadrupeds. The Ibis, Spur-winged Plover, many Storks, including *Ciconia Marabou*. Flamingo, in Egypt.

Where the Red Sea joins the Indian Ocean the most eastern promontory of Africa is occupied by



CLARKE'S GAZELLE. *Ammodorcas Clarkei*.

Somali Land. Good sport may be secured at about 35 miles from the coast. The best way to reach this field is to take passage to Aden, where all information can be obtained. Opportunities serve to cross to Bulhar, Berbera, and Zaila, but at any time a dhow can be hired. Berbera is a good place to land at in April. Starting thence with camels, Mandara, a valley under the Gau Libah (Lion Hand) Mountain, one of the Golis range, is a good head-quarters. On the slope towards the coast is high tree jungle, and therein may be got Lion (not very plentiful), Leopard, Large and Lesser Koodoo (the most beautiful creature in Somali), Wart Hog, Gerenouk (*Gazella Walleri*); in the open, Oryx, Wild Ass, etc. *Gazella Sommeringii*, called by the natives Avul, and the common *Gazella Spekii* can also be met. Beyond the Golis range, at Gulanleh, there are Lion, Leopard, Elephant, Giraffe, Rhinoceros, etc. May, June, and December are the best months. This year (1891) Mr. J. W. H. Clarke collected in the new regions of Somali Land visited by him, the very beautiful Antelope that has been declared a new species by the Zoological Society, and named *Ammodorcas Clarkei*. It combines the horns of the Reed-buck with the essential characters of the Gazelle, showing an especial affinity to the *Tithocranius Walleri*. Mr. Clarke found his prize in only one district. The Somali call this animal "Debo Sag." It has a long thin tail, which it throws up, when in flight, over toward the neck that is thrown back toward the tail, which it seems to touch. This habit seems to be peculiar. The neck and head is of remarkable beauty (see Plate). From Somali has also come a notable specimen of a new Zebra, *Equus Grevyi*, which is now in the Museum at Paris. Clarke's Gazelle was found one day's journey from Buroa

Wells at an elevation of 3,160 feet to the Maruban country, general course S. by E.

Lower down the eastern coast we come to the best fields for African sport.* These may be designated as the Kilimanjaro regions, so called from the lofty, volcanic, snow-clad peak of Kilima-Njaro, the Mountain of Greatness, or perhaps, White Mountain of the natives. And note that it is included in the sphere of German territorial influence. It has a height of 20,000 feet above the sea-level. It is one of a series of such mighty snow-capped mountains of which the Aberdare range and Kenia are features, connected by a high level of hill country. Kilimanjaro rises between Victoria Nyanza and the sea, to the north-west of Zanzibar; Kenia is still further to the north. Proceeding to Zanzibar, the outfit for native presents can be purchased there, and many arrangements can be made. Waggon's are not necessary; all the portage is by natives. Mombassa, a port to the north of the island, is the starting-place, and Taveta is the place to make for. The route to Taveta, though constantly ascending, is of so gradual a rise that it is unnoticeable. The conditions are healthy, that is, the features of marsh, swamp, and fever-infected tracts are not conditions of essential danger as they are in other similar regions of the dark continent. Taveta is a fertile station; the natives are hospitable and honest. It lies to the north of Lake Jipé, an expanse of shallow water 10 miles long at an altitude of 2,350 feet. On its shores and around game is abundant. Plenty of Hippopotamus,

* See "East Africa and its Big Game, the Narrative of a Sporting Trip from Zanzibar to the Borders of the Masai." By Captain Sir John C. Willoughby. Illustrated, 8vo. London (Longman), 1890.

some Crocodile; Pallah, Waterbuck, Bushbuck, Hartebeest, Giraffe, etc.; Lion, and the inevitable Hyæna in the woods. Beyond Taveta are several streams coming from the mountain and intersecting its



WALLERI.

GRANTI.

LESSER KOO DOO.

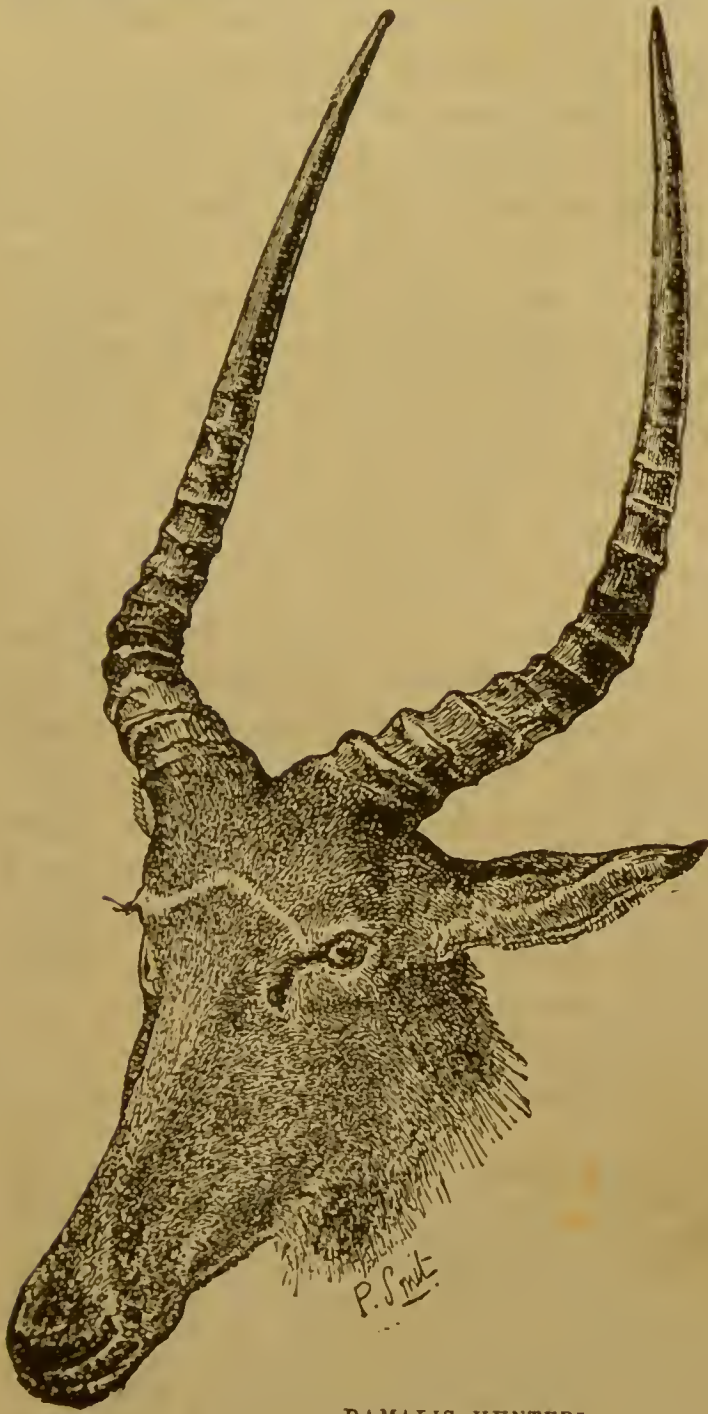
HEADS FROM KILIMANJARO.

southern base; the Shilé, the Seri, the Weri-Weri, etc. In this district are astonishing numbers of game, vast herds of Buffalo, Pallah, Zebra, Waterbuck,

Wart Hog, Hartebeest, Lion, Leopard, Giraffe, Rhinoceros, and other creatures. These fields have as yet been seldom hunted, and the animals are less timorous of man than in other African grounds. Chala is the name of this district, but also the name of a deep volcanic lake to the north of Taveta. In its neighbourhood is much game, notably Rhinoceros. The mountains of Useri and Kimagelia (4000 feet) are the most northerly inhabited part of Kilimanjaro, on the borders of the Masai country. The Masai natives are arrogant and ferocious, requiring careful dealing. Over the confines of their territory, on the banks of the Kamanger river, game is very plentiful (4600 feet). Mr. Joseph Thomson, who explored this country in 1885, reports that at one and the same moment he saw in this neighbourhood "Rhinoceros, Giraffe, Zebra, Eland, Wildebeest, Grant's Antelope, Hartebeest, Pallah, Ostriches, and Hyænas," while in the dense bush near he knew Buffalo were hidden. At the same time, coming suddenly from the forest on to a ridge, he saw near a small pond game "literally in thousands." Mr. Thomson brought home at least one new species of Gazelle (*G. Thomsoni*) and from the same region Mr. H. C. V. Hunter, F.Z.S. has sent a new Antelope, which also has been named after its discoverer, *Damalis Hunteri*. It is a large animal, and although fresh to us is said not to be rare in its habitat. An illustration of this head is given.

On the Njiri plain is much game. The forest land of Kikuyu extends from Ngongo to Lake Naiwasha; the region between about 6000 to 9000 feet above the sea-level. One notable animal frequenting the thickest forests may be looked for in these regions—the fine monkey, *Colobus guereza*. It has a coat of

velvety-black fur with stripes of long, white hair



DAMALIS HUNTERI.

meeting at the tail, which is bushy and white. Between Naiwasha Lake, which is 12 miles long by 9 broad,

and the mountains, and to the north of Naiwasha, are vast grassy plains, the resort of game. The lake itself is the home of countless thousands of Pelican, Ibis, Duck, and other aquatic birds; Hippopotami are numerous. Between this and Mount Kenia there are many hunting grounds; but the Masai warriors have to be dealt with, and much care is necessary. But on the western base of Kenia are vast pathless forests, imperfectly penetrated even by the natives, but full of Elephant, Rhinoceros, Buffalo, and other big game. On the southern and eastern slopes of the mountain are tribes difficult to deal with so far as our knowledge extends. The country between Kenia and Lake Baringo in a direction N.W. by W. is covered with wood, and has several streams. Game is plentiful: Elephant, Buffalo, Rhinoceros, Zebra, in astonishing numbers. The precipitous country round Lake Baringo may be similarly described. North of Baringo, beyond the Sük country, is Engobot, where is an almost untouched Elephant forest abounding in the mighty pachyderm. In the intervening region the game is most abundant. These regions are well worth an early visit, before they shall be devastated, in a sporting sense.*

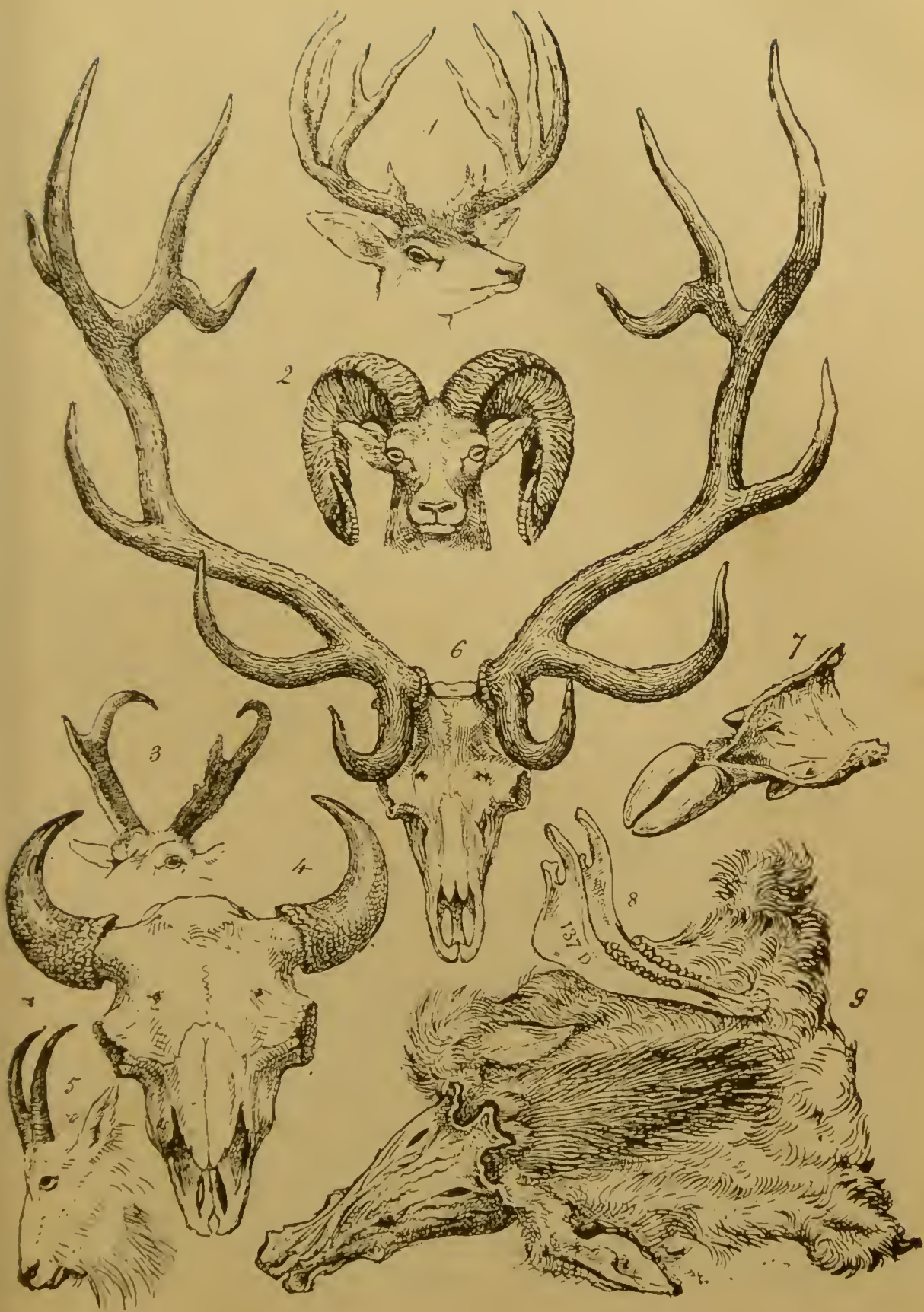
AMERICA.—The New World continent possesses

* The following bag, obtained by a party in 1887, is one of the heaviest ever made in Africa in like time: Elephant, 2 (1 tusk 6 feet long); Rhinoceros, 60; Buffalo, 20; Lion, 2; Giraffe, 7; Hartebeeste, 32; Zebra, 2; Wildebeeste, 5; Impallah, 35; Eland, 4; Waterbuck, 15; Grantii, 21; Grass Antelope, 10; Bushbuck, 4; Kirkii, 8; Wart Hog, 18; Lesser Koodoo, 2; Reedbuck, 1; Red Bushbuck, 1; Oryx, 1; Duiker, 1; Neotrogus, 1; Ostrich, 4; Bustard, 4; Hyæna (spotted), 4; Hyæna (striped), 1; Frachal, 2; Crocodile, 2. Total, 264. We might have killed a great many more if we had liked; but we only went in for good heads and variety.

AMERICA.

1. Black-tailed Deer. *Cervus Lewisii*.
2. Big Horn, or Rocky Mountain Sheep. *Ovis montana*.
3. Prong Horn. *Antilocapra Americana*.
4. Bison (Buffalo). *Bison Americanus*.
5. White Goat of Rocky Mountains (*Haplocerus montanus*).
6. Wapiti. *Cervus Canadensis*.
7. Deer-slot—to show skinning.
8. Wapiti—lower jaw.
9. Scalp of Wapiti, as saved on the field.

* * A Book of Horn Measurements and other statistical information is kept, for the information of sportsmen, at 166, Piccadilly.



several animals which afford grand sport for the hunter, but altogether the forms of animal life are not so highly developed as those of the ancient great divisions of the world. The birds, however, of Central and South America are more beautiful and resplendent with gorgeous plumage, as well as more various, than are those of any other countries. The ornithology of North America is also remarkable and valuable.

In Northern America the progress of those influences which tend to disturb great game, and to alter its habitat, are more rapid in their operation than anywhere else in the world. Of late years great changes have been wrought, particularly in regard to the Bison, or, as it is termed, the Buffalo (*Bison Americanus*). The practical extinction of this noble animal in its wild condition and for purposes of sport, may now be taken as an accomplished fact. Our loss of it is a sorry tale. When the third edition of this book was issued (1883), it was pointed out that the utterly wasteful slaughter of this animal, as well as of Elk, Wapiti, Deer, and Antelope, that had gone on of late years for purposes of trade had exterminated the Bison from some of his grounds, and made him scarcer and more shifting on others; it had been destructive of the *Cervidæ* beyond all incidence of sport. The best authorities consider that if Government intervention come now for that noble and typical American game, the *Bison Americanus*, it will come too late. It is said that a small herd of under fifty in number are "in sanctuary" in the Yellowstone Park; but some of the best authorities aver that although there may be a small herd, as is reported, in the mountains of North Park in Colorado, there is not a solitary

survivor in a wild state of the millions that used to range from Washington Territory to Rio Grande—an area of four thousand miles—so few years since. There are none north of the British line, unless it may be in the very far north by Peace River, where Lord Lonsdale possibly got his specimens. All naturalists will join in my hope that this may prove to be a pessimistic deduction from undoubted facts. But that wasteful slaughter of this noble animal for trade purposes has practically lost him to the hunter is unquestioned. Whether we are to estimate this as a gain by the progression of civilising influences, or deplore it as the hunter's loss, is a question that need not be discussed here. To estimate the real significance of the facts, one is tempted to record some particulars historically, as it were. We all know the records of the countless herds of Buffalo on the prairies when they were truly wild. As to the ruthless killing by all means of the animal for trade exigencies, Lieut.-Col. R. I. Dodge (U.S.A) has estimated on trustworthy information that the number so destroyed during the years 1872-74 amounted to upwards of five and a quarter millions! In 1880, the shipment of Deer and Antelope hides on the Missouri and Yellowstone was approximately 167,000; in 1881, 143,000—about 75 per cent. of the animals actually killed. In 1882, the Deer were followed to their summer retreats on the mountains. The trade-hunters reached far with a bloody hand!

There is no doubt that the progress of mining in Colorado, and the increasing establishment of cattle ranches in Wyoming and Montana, by breaking up the naturalness of the hunting grounds, has vastly

deteriorated the sporting value of those grand fields. The wild game retreats on the approach of tame cattle. These, the hitherto best regions for Wapiti, are rapidly ceasing to be the hunter's paradise they once were. For this kingly *Cervus* hunters now go to South-Western Oregon, North-Western California, Western Washington Territory, or Vancouver. But it must not be taken that in Wyoming and Montana, although game is not so abundant as in former years, it is not still plentiful. Great sport is to be had. It is not advisable to attempt here to indicate too definitely the best districts. The sportsman will act wisely in seeking indications on the spot that he resorts to. For Rocky Mountains sport, Wyoming Territory is a good head-quarters; and there, in the passes of the Black Hills to Laramie Valley, about Laramie Peak, and the Horseshoe, are good grounds where most of the animals now to be particularised can be got. The Wind River districts and the Soshoné Ranges offer some of the freshest grounds. For this region the season is all-important. September is a good time. For Wyoming and Montana, Billing is a good base. In May, 1886, game was plentiful at Pryor Mountain and Rock Creek, and generally in this country there were many Blacktail Deer, Wapiti, etc. Sheep were very numerous, as well as some Goats.

Moose (*Alces Malchis*) is the largest of the *Cervidæ*; the best grounds are in Canada, chiefly in Nova Scotia and New Brunswick, and in the country to the south of James Bay towards Lake Winnipeg. Caribou (Reindeer) range in the regions north of the St. Lawrence; there are many in the interior of Newfoundland and of Labrador, and between Hudson's

Bay and Alaska. Wapiti (*Cervus Canadensis*), four and a half feet at shoulder.* These magnificent game are great travellers, and shift their ground widely and with rapidity. They are subtle at "doubling, dodging, and hiding," so that cover increases the difficulty of matching them in heavy ratio. They die hard. Prong-horned Antelope (*Antilocapra Americana*), Big-horn Sheep (*Ovis montana*). These last-named are shy and difficult to get. They frequent the highest and most inaccessible points. Their habits must be studied. They are partly nocturnal in their feeding, and for this come to the lower grounds. They *ascend* for safety, and always look below them for danger. The best way to stalk them is first to detect their presence by tracks, then some hours before daylight take a chosen point of

* Of the 50 Wapiti heads exhibited at the American Exhibition in London, 1887, the measurements, taken in inches, of the best specimens are given below. The length of horn is measured along the curves behind, from base to tip of longest tine; circumference between bay and tray; and greatest width between the horns:

Exhibitor.	Length.	Circumference.	Width.	No. of Points.
Otho Shaw	55 $\frac{1}{2}$	7 $\frac{1}{3}$	48 $\frac{3}{4}$	6 + 7
Thomas Bate	45 $\frac{3}{4}$	7	43 $\frac{1}{4}$	7 + 7
A. Pendarves Vivian...	55	8 $\frac{1}{3}$	41 $\frac{1}{4}$	6 + 6
E. N. Buxton	50	7 $\frac{1}{8}$	47 $\frac{1}{2}$	6 + 5
Gerald Buxton	50 $\frac{1}{4}$	6 $\frac{1}{4}$	43	6 + 6
J. M. Hanbury	50	7 $\frac{1}{8}$	47 $\frac{1}{2}$	6 + 6
Ditto	49 $\frac{1}{2}$	7	44 $\frac{1}{2}$	6 + 6
W. A. Baillie-Grohman	60 $\frac{3}{4}$	7 $\frac{7}{8}$	52	6 + 6
H. Seton-Karr	59 $\frac{1}{2}$	7 $\frac{1}{2}$	45	6 + 6
Frank Cooper.....	62 $\frac{1}{2}$	8	48 $\frac{1}{2}$	7 + 9
Ditto	52 $\frac{3}{4}$	8 $\frac{1}{3}$	41	6 + 6
Moreton Frewen	54	7 $\frac{1}{4}$	48	7 + 8
Major Kirwan	55	8	45 $\frac{1}{2}$	7 + 6
W. A. Tulloch	54 $\frac{1}{4}$	8	43 $\frac{1}{2}$	10 + 10

vantage high up, whence you can observe as you lie well concealed, till at earliest dawn the Big-horn will come up from its lower feeding-ground, with all its suspicions directed below, toward its real danger above. To hunt them from below is to compete with them in the gaining of inaccessible places, a wasting competition.* Prong-horn are still numerous on the great prairies that touch the Rocky Mountains to the east, as well as in Sonora and North-west Mexico. In Nebraska, on the Calamus and the North Loup, fine numerous herds of Wapiti have been recently met. A smaller variety of the same deer is to be found on the plains of California and upper parts of the Missouri. Other *Cervidæ* are White-tailed Deer (*C. leucurus*), American Deer (*Cariacus Virginianus*), most numerous on the Pacific coast; Mexican Deer (*C. Mexicanus*), Cariacou Deer (*C. nemoralis*), Texas and Mexico; Black-tailed Deer (*C. Lewisii*), mostly in California;

* Measurements taken from a number of typical heads of Big-horn, brought together at the American Exhibition, are appended in inches:

Exhibitor.	Length.	Circumference.
Thomas Bate	36½	14½
Ditto	34	16
Gerald Buxton	36½	14½
Ditto	28½	15
Ditto	36	14
W. A. Baillie-Grohman	39	15¾
H. Seton-Karr	35¾	15⅞
Ditto	38½	16⅝
Frank Cooper	31	16½
G. D. Whatman	31½	15¾
Major Maitland Kirwan	37	16¼
Ditto	36½	15½

Mule Deer (*C. macrotis*), eastern slope of Rocky Mountains. Of *Carnivora*: Grizzly Bear (*Ursus ferox*), Cinnamon Bear, Black Bear (*U. Americanus*), Polar Bear (*Thalarctos maritimus*), in the Northern Sea; Puma (*Felis concolor*), which takes the place of a Lion in the New World, can be met in the Southern States below New York. There are two varieties, and sometimes a black example is met with. Lynx (*F. Canadensis*), in the woody districts of Canada. Many of the smaller fur-bearing animals, among which is the large Otter (*Lutra Canadensis*), peculiar to the northern districts, and the Opossum (*Didelphys Virginiana*). The Water Fowl are innumerable and fine, of numberless species. Red Flamingo (*Phænicopterus Chilensis*) in the warmer parts, but the colour is not so good as that of the European species. Among the *Raptores* will be found—Bald Buzzard (*Pandion Haliæetus*), the Sea Eagle (*H. leucocephalus*), the symbol of the United States, in every part of which it may be encountered, and the Golden Eagle. The Harpy Eagle (*Harpyia destructor*) must be sought in the thick forests of Mexico. The fine ivory-billed Woodpecker (*Picus principalis*) can be got in Mexico and some of the Southern States, but never north of Virginia. In Mexico and Guatemala may be collected the Trogons, perhaps the most superb of all birds. They are never found on open places or inhabited tracts, but are of solitary habits, frequenting the deepest woods. *Trogon resplendens*, the most splendid in colour and of finest form, should be sought for; *T. Mexicanus*, of exquisite and varied colouring, is in the north of Mexico; there are other species of almost equal beauty. The Wild Turkey (*Meleagris Gallopavo*) is plentiful in the North-Western States, and ranges to the Isthmus of Darien; another

species of singular beauty, *M. ocellata*, may be got in Honduras. The Galeated Curassow (*Ourax Pauxi*) and the Crested Curassow (*Orax Alector*) may be collected in Mexico.*

There are many species of fine fish in the rivers and lakes of America that afford wonderful sport to the angler, but it is not necessary to particularise them here. The traveller who appreciates this description of sport will doubtless make part of his apparatus the tackle that will enable him to fish with advantage, when his opportunity comes, in the fresh waters of the continent—with augmented pleasure when he plies his art in unfrequented streams and under unaccustomed conditions. But attention may well be directed to one phase of angling that has lately been practised with startling results, at all events for Europeans. On the west coast of Florida, and probably in neighbouring waters, can be captured—among other species—the so-called King Herring (called also the Tarpon, *Megalops thrissoides*), a shapely fish that is to be angled for with rod and line, affording, as may be imagined, strong and exciting sport, demanding utmost skill, when the game specimens may be captured up to 200 lbs. in weight, and having a length of say 7 feet, from nose to tail! The behaviour of these monsters on the hook is most game, and a veritable trial of strength as well as skill ensues. The angling is from a boat; the struggle will often last five hours, from strike to gaff. The reel work is tremendous. The fish is very handsome, and bears mighty silver scales.

* See "Three Years' Hunting and Trapping in America and the Great North-West." By J. Turner-Turner. One Vol. (McClure & Co.), London.

Southern America is not very rich in great game, but has overwhelming interest for the naturalist. Of *Carnivora*, the principal are Puma (*F. concolor*), as far south as Paraguay, in Chili, and generally throughout Brazil—the Gray variety is never got north of the Isthmus; Jaguar (*F. Onça*) is found generally about this half of the continent, but most numerous in Paraguay and the Brazils. There is a handsome black variety of this Cat to be met with frequently. Three species of Ocelot can be collected in Paraguay, and probably in Peru, viz., *F. pardalis*, the Gray (*F. armillata*), and the Painted (*Leopardus pictus*). The Chatí (*F. mitus*), Pampas Cat (*F. Pajeros*), and several others of similar species, as far south as Patagonia. In this extreme district of the Southern Continent the Llama or Guanaco (*Auchenia Huanaca*) can be found in numbers, about Port St. Julian, and indeed inland from almost every harbour on the Atlantic coast. This animal goes in herds and affords excellent stalking, as to the method of the sportsman. For the larger game such as Pumas, Jaguars, Tapir, Ocelots, and even for Peccaries, etc., dogs are necessary; indeed, the ordinary traveller, walking through large tracts of the primeval forest seldom encounters the greater game haphazard. Men are sent with dogs into the forest; they find an animal which invariably takes to the near river; there the sportsman waits for him, and generally gets his shot as the creature swims across the water. Peccary do not take the water, and are followed to where the dogs find them in the wood. The trip to such ground, using Rio as a base, can demonstrably be made very cheaply and expeditiously.* There are many wild fowl, and abundant

* Vide *Field*, September 18th, 1886, *et seq.*

sport can be had by those who are able to reach this seldom visited coast. Farther south, on the Straits of Magellan, as far as Punto Arenas, similar game can be found in plenty, and all this range of coast from Monte Video to Punto Arenas includes some of the finest natural scenery in the whole world. For a yachting voyage, so arranged that excursions can be made inland, this region, as yet almost untouched by the sportsman presents exceptional advantages. Otter (*Lutra Braziliensis*), is plentiful in the lakes and rivers of Paraguay. Llamas (*Auchenia Huanaca*) are in Columbia, Peru, Chili, on the Cordilleras of the Andes, but recently reduced in numbers; they are also in Paraguay, but more rare. Tapir (*Tapirus Americanus*), all over South America, but never north of Darien. Of *Cervidæ*: The Guazupuco (*Blastocerus paludosus*) and Mazame (*B. campestris*), northern Patagonia; Tarush (*Furcifer antisiensis*), mountains of Bolivia; Guemul (*F. Huamel*), on eastern coast; Cariacou (*Cariacus nemoralis*), Guiana; the beautiful little Gauzu-viva (*Coassus nemorivagus*), Brazil; the Cuguacu-ete (*Coassus rufus*), large herds in the marshy woods; several species of Brouket in Brazil and Chili. The birds are wonderfully varied and beautiful. The American Ostrich (*Rhea Americana*) is numerous on the plains of La Plata, as is also the smaller species (*R. Darwinii*). Several fine *Raptores*: Condor of the Andes (*Sarcorampus Gryphus*), one of the largest of the *Vulturidæ*, mostly in Peru and Chili; Caracara Eagle (*Polyborus Braziliensis*), on the coasts of Venezuela and Brazil, most abundant in the south and east of Brazil, and in Paraguay. Harpy Eagle, in Caracas, Guiana; Brazilian Eagle (*Morphnus Urubitinga*), *Asturina cinerea*, and numerous other *Falconidæ* in

Guiana and Brazil. The naked-cheeked species are confined to the southern parts of the continent. Red Flamingo, Peru, Chili, coasts of Brazil, and Guiana; the great Stork-like Jabiru (*Mycteria Americana*) will be found generally on the marshes and round lakes; while about similar places in Brazil and Guiana those curious fine birds, the Horned Screamer (*Palamedea cornuta*) and the Chaja (*Chauna Chavaria*) may be met with, the last named in Paraguay, and La Plata as well; the Çariama (*Palamedea cristata*), a bird of retiring habits, frequents the mountain plains of Brazil, and is found in Paraguay, but is scarcer there. Of *Cracidæ*, the Crested Curassow (*Crax Alector*), and the Guan (*Penelope cristata*), are in Brazil and Guiana; the *Ortallida Motmot*, a pheasant-like bird, and the Hoazin (*Opisthocomus cristatus*), and others, in Guiana; the Red-knobbed Curassow (*Crax Yarellii*), in Peru. Ivory-billed Woodpecker (*Picus principalis*), in Brazil. The beautiful Cock of the Rock (*Rupicollia aurantia*), now becoming rare, in Guiana, especially about the river Oyapock; another of this species, the *R. Peruviana*, is in Peru. The Great Toucan (*Ramphastos Toco*), in the wooded districts of the river Plata and Guiana; others, *R. Cuvieri*, *Pteroglossus Humboldtii*, and the Black-banded Toucan (*P. pluricinctus*), about the banks of the Amazon. Several species of the exquisite *Piprina*, and other magnificent Chatterers, or Fruit-eaters, are in Brazil and Guiana. These last-named countries, with Peru and Chili, and the Tropical regions generally, are the home of the incomparable *Trochilidæ*, or Humming Birds, which are found mostly about the marshy deltas and the banks of the rivers. Thousands of gorgeous Macaws, and various species of *Psittacara*, or Parakeets, inhabit the warm districts of the Andes, the Brazils, and Guiana.

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7



22



4



3



5



A



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- 4 Chrysalis
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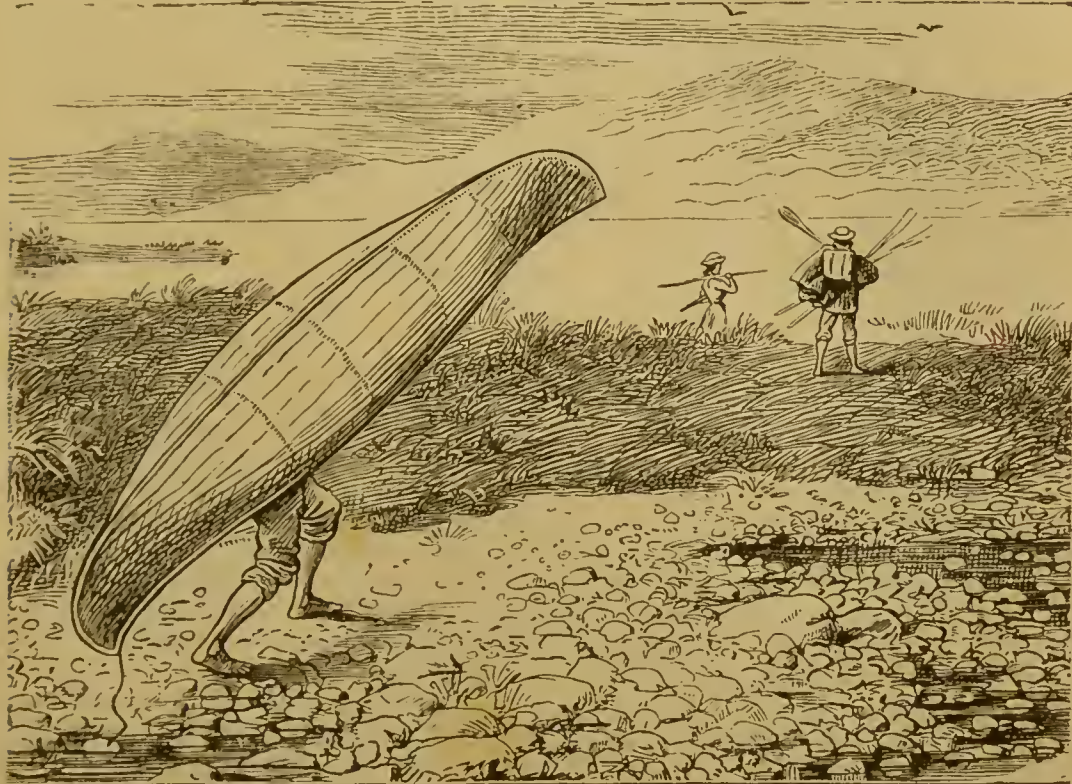
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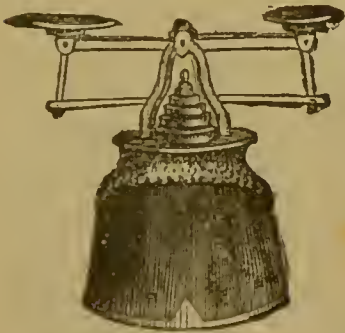
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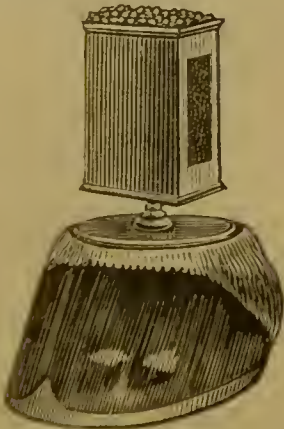


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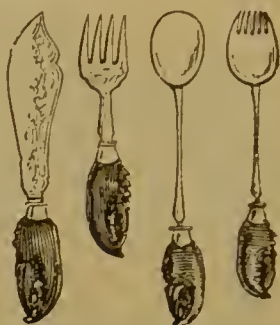
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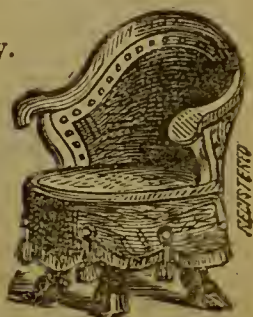
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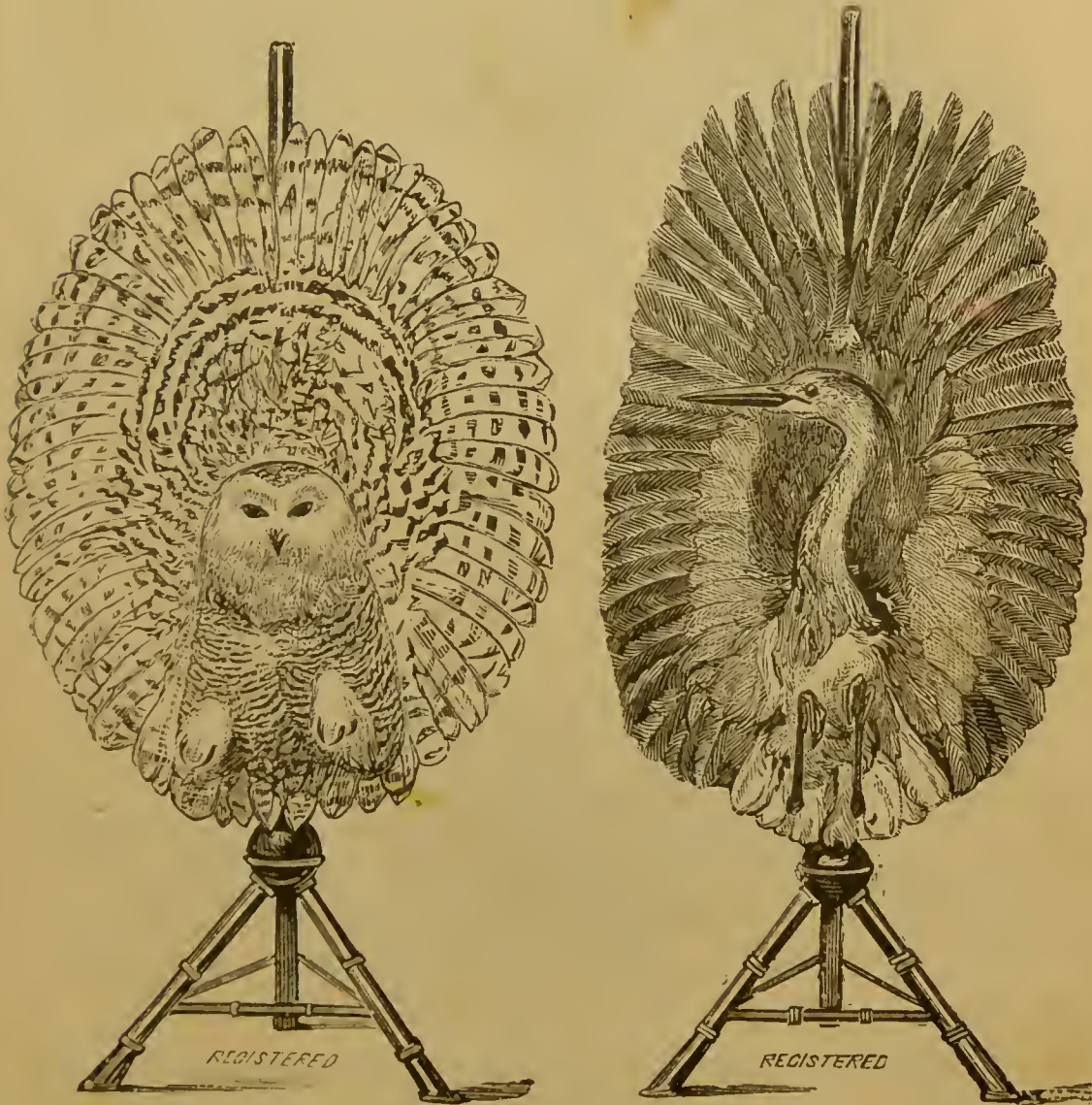
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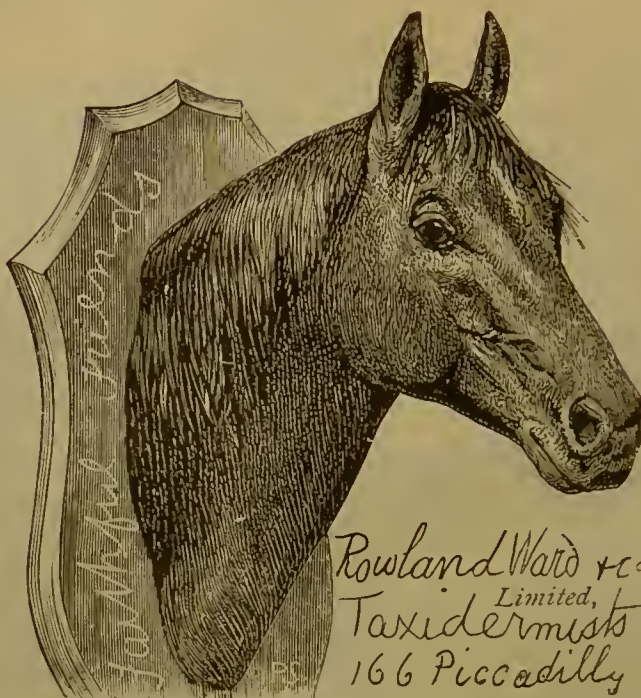
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arrived at the form of a boat that is the most perfect of any for its assigned uses. These Canoes were first introduced for use in this country by MR. ROWLAND WARD, F.Z.S. They are native built, and are beautifully constructed of Basswood, on exquisite lines. They are so light in weight that one can be carried easily by a man past obstructions or impracticable rapids, locks, or from one water to another. One of these craft in length 14 feet 4 inches, with beam of 2 feet 4 inches, weighs only 50 lbs.; one of 16 feet 6 inches, with 2 feet 9 inches beam, weighs 65 lbs. They are capacious and trustworthy, of minimum draught, and achieve the greatest economy of individual power for locomotion on the waters. For Fly-fishing or Trolling in English waters, for use in Wildfowl or River Shooting, for service in times of Flood, they are particularly adapted; as well as for the needs of pleasure. They can be easily forwarded about, and can be sent promptly to any railway station. The price, including paddles, is from 8 guineas to 20 guineas. Five sizes are kept in stock.

By Appointment to H.R.H. the Prince of Wales, H.R.H. the Duke of Edinburgh, and the Courts of Europe.

Rowland Ward & Co., Practical Naturalists, 166, Piccadilly,
London, W.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

DIV. I. HEALTH. GROUP I. FOOD. CLASS I.—Specimens, etc., contained in the Gabled Farm structure, designed to exhibit in natural arrangement, *Food from the Poultry Farm*. The whole exhibit and all the specimens designed and set up by MR. ROWLAND WARD, F.Z.S. Both sides of the structure and the ends were of plate glass. Measurement: Ground, 20 ft. × 11 ft. Height, 14 ft., and it contained Twenty-four Specimens or Groups of Specimens of Domestic Fowls, etc.

DIV. I. HEALTH. GROUP I. FOOD. CLASS I.—*Food from the London Markets*.—The whole exhibit and all the specimens designed and set up by MR. ROWLAND WARD, F.Z.S., and it contained Sixty-two Specimens or Groups of Specimens of Animals and Birds, used for Food in the Markets of the Metropolis.

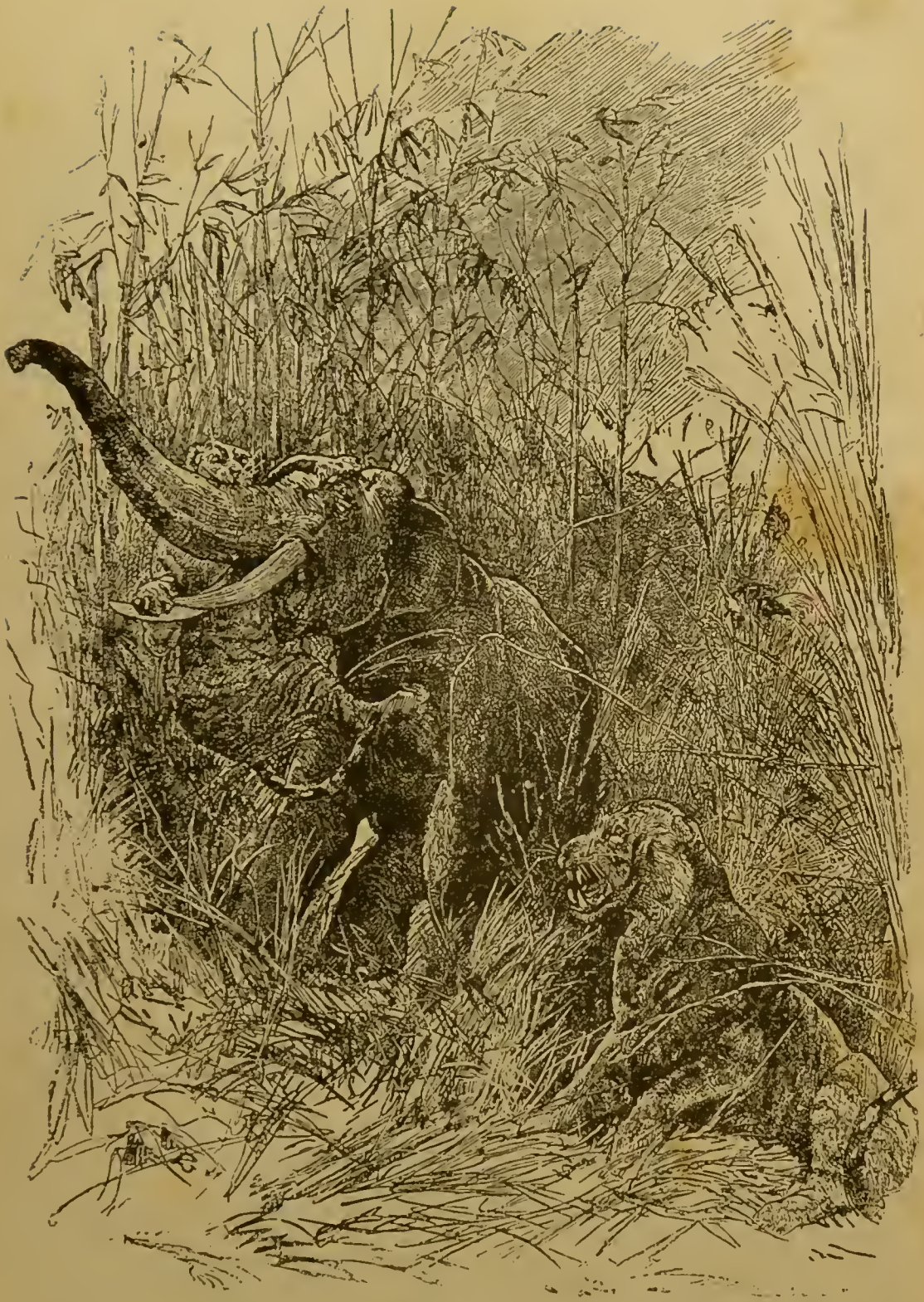
COLONIAL AND INDIAN EXHIBITION, LONDON, 1886.

The Reproduction of the Jungle and Indian Animal Life that was so observed a feature of the Exhibition was entirely designed and arranged, and the animals modelled, by ROWLAND WARD, F.Z.S. The public journals, as well in the Colonies and abroad as in this country, fully recognised the importance and attractiveness of these illustrations—the most extensive and varied work in Artistic Taxidermy ever produced. A wish to preserve some of the journalistic records may be pardoned.

“But everything else here is likely to be forgotten in presence of the wonderful jungle scene which MR. ROWLAND WARD has constructed. . . . This will certainly be the first of the many attractions to which visitors will turn. . . . They will find themselves in presence of a scene which is likely to keep their gaze for some time. MR. WARD has made the most of his limited space, into which he has collected the scenery and life which, in reality, is found scattered over an area of many thousand square miles. On the right we



COLONIAL AND INDIAN EXHIBITION, 1886.
TROPHY OF INDIAN ANIMAL LIFE. *Royal Commission.*
Rowland Ward, F Z.S., *fecit.*



COLONIAL AND INDIAN EXHIBITION, 1886

THE TROPHY OF COOCH BEHAR.

Rowland Ward, F.Z.S., *fecit.*

THE SPORTSMAN'S HANDBOOK.

have a trophy from Kooch Behar, formed by His Highness the Maharajah, the most prominent feature of which is a tiger hunt. We see a great group in the deep grass jungle. . . . Adjoining this are trophies designed to represent generally the Fauna and Flora of India, by representative animals and birds, picturesquely grouped in illustration of their life-habits."—*Times*.

"The visitors . . . were lost in admiration of MR. ROWLAND WARD's masterly designs, modellings, and general arrangement. The novelty is already known as 'the jungle.' . . . The deep grass jungle is occupied necessarily by many creatures which would not in their native wilds be found in such close companionship. . . . The scene is rendered with true tragic power."—*Daily News*.

"These numerous beasts . . . seem to illustrate the Fauna of India in a most vivid manner, and are very artistically prepared and arranged. . . . The entire trophy has been prepared by MR. ROWLAND WARD. This group will unquestionably be one of the leading attractions of an exhibition which is already full of marvellous things."—*Morning Post*.

"Fitted up with the most perfect completeness—a jungle—the work of MR. ROWLAND WARD. . . . The whole scene depicted is so life-like that one is startled by its vivid realism. . . . This jungle alone is almost enough to make an exhibition. . . . Besides, MR. ROWLAND WARD has designed and arranged such other scenes in connection with several Colonial Courts."—*Daily Chronicle*.

"MR. ROWLAND WARD, of Piccadilly, provides what will probably prove the most attractive feature of the exhibition, in the form of a series of picturesque trophies representing India, Ceylon, South Africa, Canada, and Queensland."—*Sportsman*.

"Perhaps the first place must be accorded to the jungle scene of MR. ROWLAND WARD, which stands at the head of the Indian Courts, and which will certainly prove one of the favourite sights of the vast show."—*Daily Telegraph*.

"THE JUNGLE," 166, PICCADILLY, LONDON, W.

THE ANGLO-DANISH EXHIBITION, SOUTH KENSINGTON, 1888.

Wild Animal Life of Denmark.

The *feræ naturæ* of Denmark proper are mostly similar to those of Central Europe, with certain features due to local conditions, and the *Aves* now predominate. The characteristics of the Fauna of the more Northern countries are in many species exemplified in Denmark. The illustrations presented, all modelled and prepared by MR. ROWLAND WARD, F.Z.S., were grouped picturesquely, with naturalistic effect, in regard to habitat and the vegetation of the region; but for the sake of effect, some of the great *carnivora* of the extreme Northern Fauna were brought into the picture, so to speak, and a glimpse of the Arctic snow was obtained beyond the purely Danish region.

ADDENDUM.

The spectator, looking through an opening, had a general view of natural scenery. There was a fine group of Snowy Owls (*Stryx nyctea*), a number on the wing, and many in the underwood of the silver birch trees. Next, twenty snow-white Ptarmigan were seen winging their way. In the foreground were grouped Grey Ptarmigan. The *Anatidæ* formed a most important feature, furnishing many groups of beauty and interest, amongst which the Eider Duck (*Anas Mollissima*) was conspicuous. Wild Swans, Geese, Gulls, and many smaller birds abounded, and among them some migratory creatures, familiar to our English coasts, could be recognised. A number of Otters were introduced. Amid the Arctic ice in the distance were seen White Bears, over whom hovered many Gulls, etc.

The building devoted to these collections was constructed over the fountain basin in the grounds. It presented the appearance of a rocky mass, through the fissures of which the visitor could see the wild animal life of Denmark, and of the further North.

All the trophy was designed, and the animals modelled and prepared by

Mr. Rowland Ward, F.Z.S., 166, Piccadilly, London.

THE ROYAL MILITARY EXHIBITION.

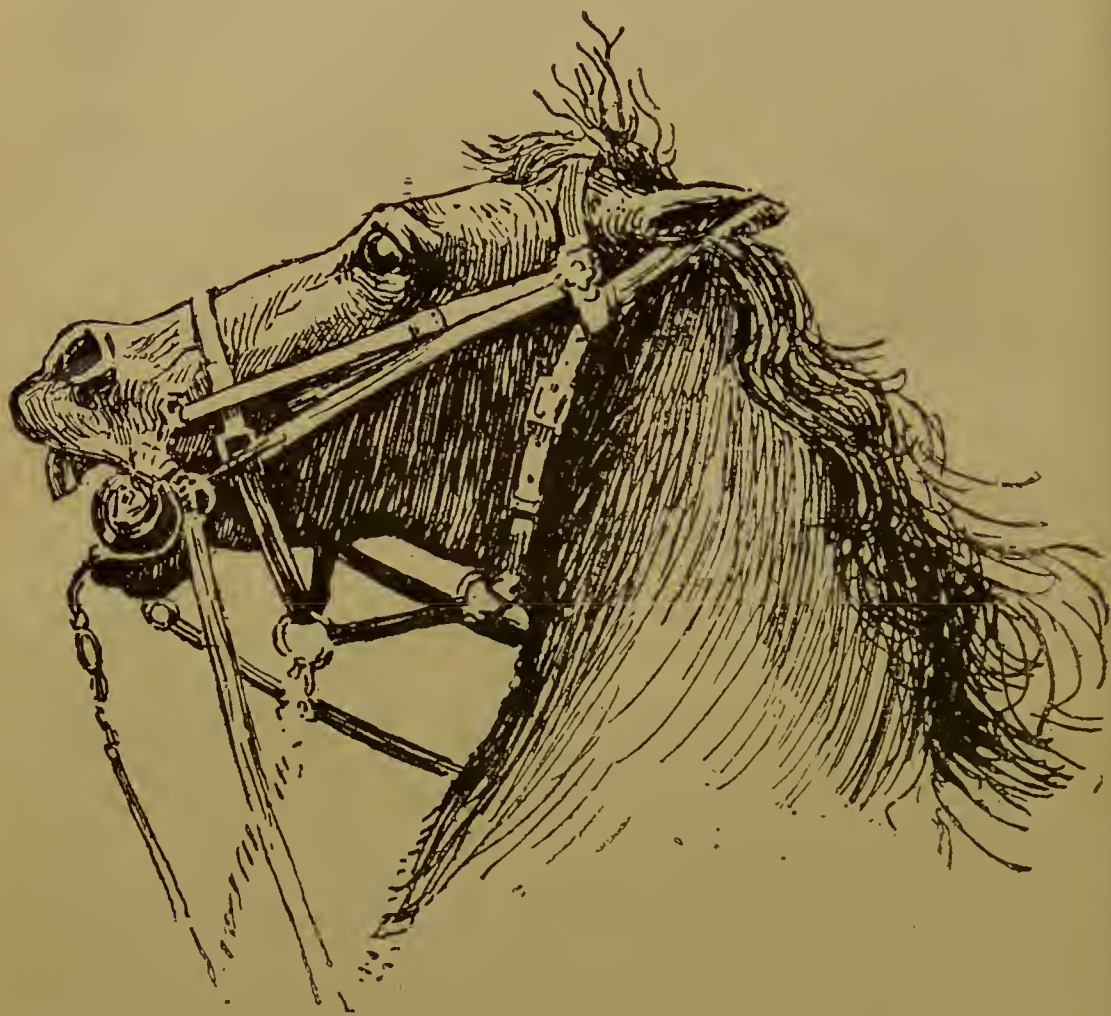
2849 Army Medical Department.

In this exhibit endeavours have been made to illustrate, as far as the limited space will allow, the following general idea. The equipment used by the medical department on active service in the field, and the appliances employed in the treatment and carriage of a wounded soldier from the fighting line to the base of operations. The scene, supposed to be on foreign service, in a tropical or sub-tropical climate, gives lines of communication, showing various modes of transport, ambulance waggons, elephant and camel transport, etc. The wall pictures, as well as the foliage and natural accessories, and the animals, designed and modelled by Mr. ROWLAND WARD, F.Z.S., 166, Piccadilly, London, W.

The Globe, May 5th, 1890, says: "The Ambulance Section of the Military Exhibition to be opened by the Prince of Wales at Chelsea on Wednesday has been arranged by Mr. ROWLAND

ADDENDUM.

WARD, F.Z.S., the distinguished naturalist who produced the famous jungle scene in the Indian and Colonial Exhibition, 1886. The arrangement is on an original plan, presenting all the details and resources of the systems adopted, and especially their em-



ployment on foreign service. Mr. WARD has designed and arranged a background with painted natural scenery, in front of which are placed the tents, waggon, and other apparatus, together with elephants, camels, draught animals, tropical foliage, and other foliage, the whole scene being alike effective and truthful."

HOLLAND & HOLLAND.

New "Paradox" Ball and Shot Gun (PATENT).

An extraordinary weapon. A 12-bore Double Gun of ordinary weight (about 7 lb.), shooting shot with the pattern and penetration of a first-rate 12-bore shot gun, and conical bullets, up to 100 yards, with the accuracy of an Express Rifle.

"A marvellous performance."—*The Times*.

"We need scarcely remark that it will commend itself to the notice of foreign sportsmen without any further assistance from our pen."—*Field*.

"The shooting with shot was all that could be desired, the 'plates' made being even and round. We then retired to the 100 yards range, and tried the 'Paradox' again with Express bullets, and fired six shots, right and left barrels alternately. All six bullets were placed in a space $1\frac{3}{8} \times 4\frac{1}{2}$ inches, beating all the Express rifles at the 'Field' trial."—*Asian*, Dec. 13, 1887.

The following are a few of the many Testimonials as to the value of the "Paradox" Gun:

"I consider the 'Paradox' 12-bore, with $4\frac{1}{2}$ drs. powder, to be the most perfect weapon for Indian shooting."—Extract from Letter from Sir Samuel Baker to *The Field*, June 16, 1889.

"I killed three bears in Kashmir with it, from 40 to 100 yards. In each case the bear was clean killed the first shot."—(Signed) W. K. LITTLE."

"I am convinced that the most useful and charming weapon of modern times is Hollands' 'Paradox' Gun. . . . It will, indeed, be a tough grizzly which can resist the shock and penetration of a hollow bullet from the 'Paradox,' which at 100 yards will go clean through it from shoulder to shoulder. Nor will the ducks and grouse share a better fate with shot cartridge."—Extract from "Three Years' Hunting and Trapping in America," by J. Turner Turner.

Referring to the Earl of Lonsdale's recent sporting trip to North America and the Arctic regions, *The Daily News* of June 29, 1889, says:—"The Earl carried with him a remarkable gun, which he calls the 'Paradox,' with which sole weapon he was able to collect moose, bear, etc., and birds as well."

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"FIELD" RIFLE TRIALS.—"There could be no doubt of the great superiority of Messrs. Holland's rifles."—*Field*, October 13, 1883.

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EXPRESS RIFLES.

Bore.	Regulation Charge for C. & H.'s Express Rifles.			Light Charge for C. & H.'s Express Rifles.			PRICES.	
	Powder.	Bullet.		Powder.	Bullet.		Hammer or Hammerless, Top Lever, Treble-Grip, Safety Bolt. Non-Fouling, Accuracy of highest degrees, to shoot C. & H.'s Regulation or Light Charges.	
400 ..	110 grs.	230 grs.	..	83 grs.	230 grs.	..	Cash. £25 10	Credit. £30 0
450 ..	110 "	326 "	..	110 "	270 "	..	£35 14	£42 0
500 ..	138 "	440 "	..	120 "	340 "	..	£42 10	£50 0
577 ..	165 "	600 "	..	160 "	520 "	..	£51 0	£60 0

Solid drawn Cartridge Cases.

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Hammerless Drop-Barrel, Top Lever, Safety Bolt, Self-

Ejector, Pistol Hand, etc. 8½ to 10 Guineas Cash, 10 to 12 Guineas Credit.

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Hammerless £23 5s. „ 26 „ „

Ditto, Self-Ejector £27 10s. „ 31 „ „

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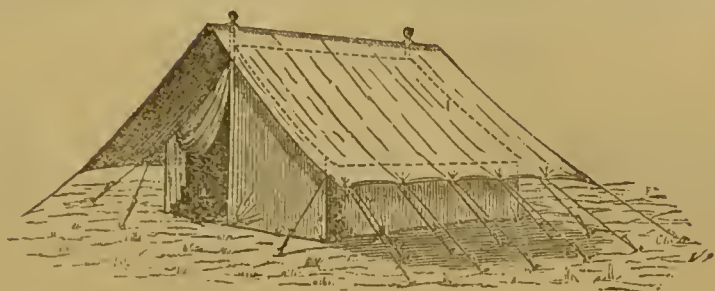
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